Microsoft Cluster Installation Documentation
for
HP NetServer LXr 8000 with HP A3661B Model 30/FC
High Availability Disk Array

To assist you in installing your HP NetServer Microsoft Cluster, this file contains the documents listed below in one pdf file.

- **Installation Overview** - This page provides an overview of the installation steps provided in the Installation Guide.

- **Configuration Guide** - This guide provides configuration information specific to your cluster configuration that you will need during installation of your cluster.

- **HP NetServer Microsoft Cluster Installation Guide** - This is the first of two documents used to install the cluster. It covers the installation of all cluster supported HP NetServers and the cluster software, and references the Shared Storage Supplement for installation and setup of the shared storage.

- **Shared Storage Supplement** - This supplement is specific to the shared storage device you are using and must be used with the installation guide. It provides instructions for installing and setting up your shared storage devices.

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13 September 1999
(See next page)

Version History

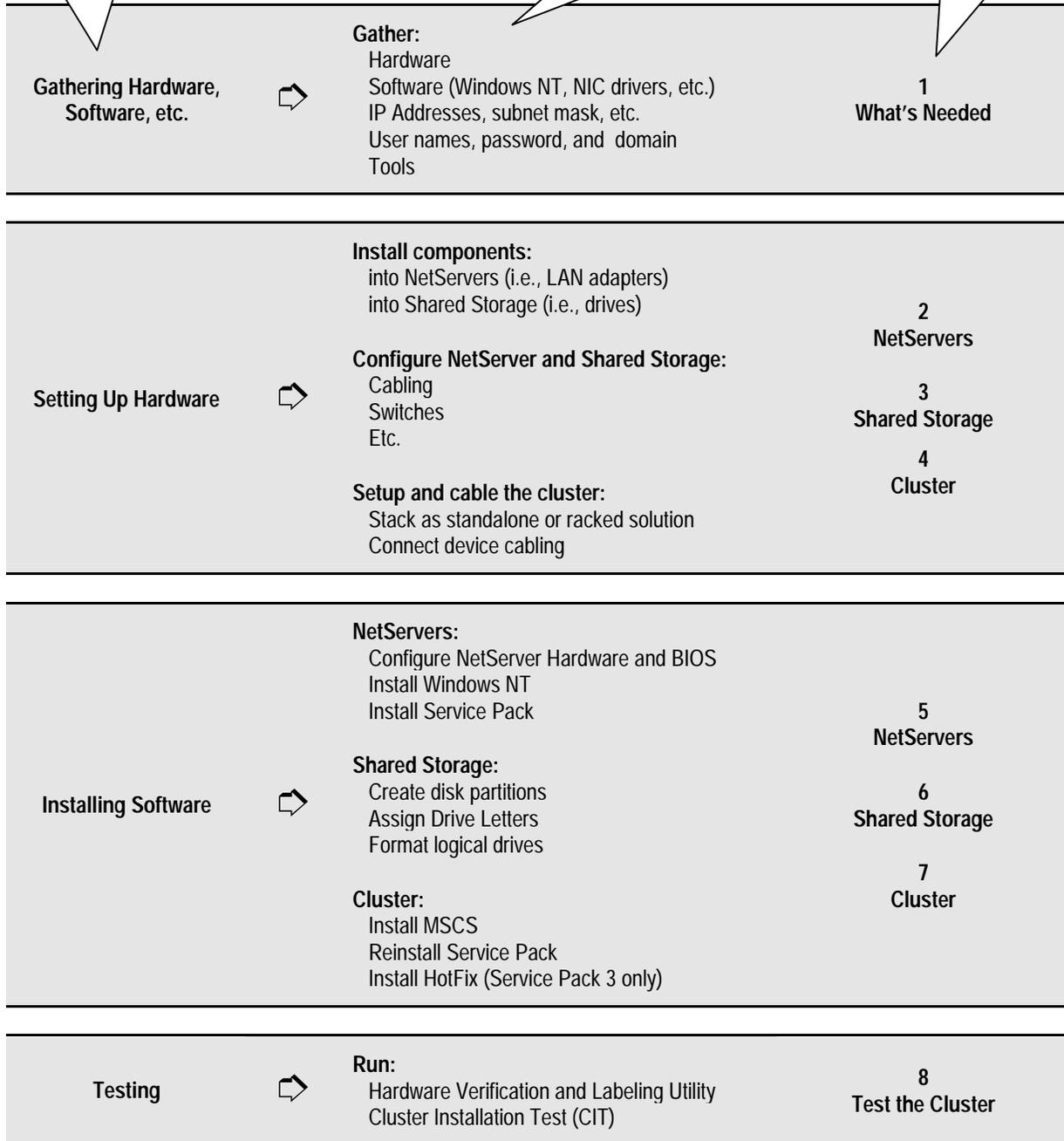| 13 September 1999 | Revised the Configuration Guide to add a description of the cluster's SPOFs. See the Configuration Guide for details. |
9 August 1999	Revised pdf to add 30/FC Install Guide Supplement.
21 April 1999	Revised Configuration Guide to limit the HP NetServer CPU speeds to 400 or 450 MHz.
11 January 1999	Package released

Installing a Cluster

"The Big Picture"

The Overall Tasks

What you will be doing!

How to do it!
(See the referenced part in the Installation Guide)

Gathering Hardware, Software, etc. ⇨	**Gather:**
	   Hardware
	   Software (Windows NT, NIC drivers, etc.)
	   IP Addresses, subnet mask, etc.
	   User names, password, and domain
	   Tools
		1
		What's Needed

Setting Up Hardware ⇨	**Install components:**
	   into NetServers (i.e., LAN adapters)
	   into Shared Storage (i.e., drives)
	
	Configure NetServer and Shared Storage:
	   Cabling
	   Switches
	   Etc.
	
	Setup and cable the cluster:
	   Stack as standalone or racked solution
	   Connect device cabling
		2
		NetServers
		
		3
		Shared Storage
		
		4
		Cluster

Installing Software ⇨	**NetServers:**
	   Configure NetServer Hardware and BIOS
	   Install Windows NT
	   Install Service Pack
	
	Shared Storage:
	   Create disk partitions
	   Assign Drive Letters
	   Format logical drives
	
	Cluster:
	   Install MSCS
	   Reinstall Service Pack
	   Install HotFix (Service Pack 3 only)
		5
		NetServers
		
		6
		Shared Storage
		
		7
		Cluster

Testing ⇨	**Run:**
	   Hardware Verification and Labeling Utility
	   Cluster Installation Test (CIT)
		8
		Test the Cluster

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HP NetServer LXr 8000
with
HP A3661B High Availability Disk Array Model 30 / FC
## Cluster Configuration Guide

13 September 1999

Introduction

This document defines the supported HP NetServer LXr 8000 and A3661B High Availability Disk Array Model 30/FC (LXr 8000 / Model 30-FC) configurations for Microsoft Cluster Server. These configurations minimize single points of failure (SPOF), provide maximum availability, and have been certified by Hewlett-Packard and Microsoft. This guide is prescriptive; it describes the configurations supported by HP. Any deviance to these configurations can result in an inoperative cluster or an operating cluster with degraded performance, hidden SPOFs, etc., and therefore will not be supported by HP.

What's Defined in a Racked Cluster
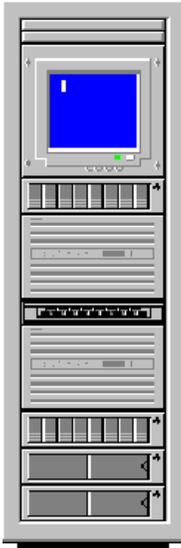
Cluster

SPUs

Local and Shared Storage

Intra-cluster and Client LANs

Shared Storage Cabling

Cluster

Type of SPUs	HP NetServer LXr 8000
	Each node must be the same model SPU, but may have different clocks speeds, main memory sizes, cache sizes, and number of CPUs (2, 3, or 4).
Number of nodes	2
Shared Storage	See *Shared Storage* below.
LANs:	
Client LAN	Any NIC that is HP and Microsoft approved. See *Client LAN* below.
Intra-cluster (Heartbeat) LAN	HP D5013A only with crossover cable. See *Intra-cluster LAN* below.
Power source	Direct from power mains, power conditioner or uninterruptible power supply (UPS) using any power conditioner or UPS.

System software:

Navigator version	L.14.00 or later
Operating System	Microsoft Windows NT Server 4.0, Enterprise Edition or later
Service pack	SP3 with hotfix "clusfixi" or later
Single Points of Failure (SPOF)	The Model 30/FC Disk Array virtually does not have single points of failure. However, care should be taken to bind LUNs as described in the Model 30/FC Disk Array manual. The manual addresses topics such as; spreading LUNs equally across internal buses and using RAID modes. In a cluster configuration, single points of failure arise due to the method used to connect the disk array to the server. These single points of failure are as follows:

- Due to Windows NT inability to allow for dual data paths, a total fibre-channel hub failure (removal of power from the hub, catastrophic failure of multiple hub ports) will result in the loss of the cluster. It is possible to power the hub using an UPS to remove part of the issue, however an unforeseen total hub failure would still be a single point of failure. Current data on the fibre channel hub indicates that risk in this area is minimal.

- If the data connection between the hub and Model 30/FC Disk Array is broken the cluster will go down. The fibre channel cables are generally known to be robust with an insignificant possibility of failure.

- A failure in the storage processor of the Model 30/FC Disk Array will result in a loss of the cluster. The possibility of the storage processor failing is small. Current configurations do not allow for failover to another storage processor in the Windows NT environment.

SPU

Model	HP NetServer LXr 8000
Clock speed	400 MHz. or higher
No. of CPUs	2 – 4
BIOS version	Release 1 or later
CPU cache	Any size
RAM	256 MB minimum. Must be HP.
No. of power supplies	3
Local storage	Internal or external, using any controller except NetRAID 1 or 3. Must use HP disks. See *Local Storage* below.
I/O slots:	P3 – P4 Shared storage controller P1 – NetRAID local storage P5 – Intra-cluster (Heartbeat) LAN P6 – Client LAN All others – Any other plug-in cards.

Storage

Local

Physical drive location	SPU internal drive bays or HP external drive cabinet (e.g., HP Rack Storage/8 or /12)
Disk drives	Must be HP
Controller	SPU embedded controller or any controller, any number, manufacturer or driver in I/O slot P1 for NetRAID local storage (except NetRAID 1 or 3). See *SPU I/O slots* above.
SCSI bus	Any HP cables that meet SCSI specifications and any SCSI bus speed

Shared Storage

Host Bus Adapter:	
Model	A5246A HP Fibre Channel Adapter Kit for NT
No. of HBA	1 – 2. (See Shared Storage Configurations.)
Driver	2.xx
SPU I/O slot	P3 (1st HBA) and P4 (2nd HBA)
Disk Array Controller:	
Model	SP630/FC Storage Processor (ordered with A3661B or A3662B)
No. of controllers	1 – 2. (See Shared Storage Configurations.)
Microcode	9.45.03 or greater
Disk Array Storage:	
Model	A3661B HP High Availability Disk Array Model 30/FC.
No. of cabinets	See Shared Storage Configurations.
Controller	1 – 2. (See Shared Storage Configurations.)
Disk capacities:	4 GB, 8.8 GB, 17.8 GB
ArrayGUIde	Version 1.7.0 or greater
RAID levels	1, 1/0, 3 and 5
Logical units	Logical units within each array must be numbered from 0 – 7.
Hot spares	Recommend assigning logical unit numbers 8 or greater
Power Supply	3
RAID arrays	Different size or speed disks are allowed in the same RAID array but are not recommended in the same logical unit.

Shared Storage Cables (Fiber Optics)

Cables for the Short Wave Port of either a Short or Long Wave Hub	A3583A 2 meter FC cable, A3531A 16 meter FC cable, A3735A 50 meter FC cable, A3736A 100 meter FC cable, Any cable ≤500 meters per segment that conforms to ANSI X3.230-1994 Fibre Channel Standards Specification (FC-PH) rev 4.3.
Cables for the Long Wave Port of a Long Wave Hub	Any cable ≤2 kilometers that meets ANSI X3.230-1994 Fibre Channel Standards Specification (FC-PH) rev 4.3.

Shared Storage Configurations

Configurations:

Basic	See "Basic Configuration Cabling Diagrams with Single or Cascaded Hubs."
Redundant	See "Redundant Configuration Cabling Diagrams with Single or Cascaded Hubs."

Fibre Channel Hubs:

Model	A3724A HP 10-port Short Wave Fibre Channel (FC) Hub A4839A HP 10-port Long Wave FC Hub
No. of Hubs	Basic Configuration: 1 or 2 Redundant Configuration: 2 or 4 with 1 min. or 2. max. per FC Arbitrated Loop.

Disk Arrays (See Shared Storage.):

No. of Disk Arrays	1-8
No. of Controllers	1 per Disk Array for Basic Configuration. 2 per Disk Array for Redundant Configuration.

LANs

	Intra-cluster (Heartbeat) LAN	Client LAN
LAN connection	HP D5954A crossover cable or any equivalent The intra-cluster LAN may only be used for cluster node communication via a crossover cable. It may not be used for client communication.	Any LAN
NIC:		
Model	HP D5013A (10/100TX PCI)	Any that is on both the HP Tested Products List and the Microsoft Hardware Compatibility List.
Driver	3.27.00.0001 or later (Do not enable FEC Features.)	Any driver NOTE: If the NIC used is the same as the Intra-cluster LAN, then the Client LAN must use the same driver as the Intra-cluster LAN.
No. of NICs	1	1 minimum
SPU I\O slot	P5	P6

Shared Storage Cabling

This part of the guide defines the allowable cabling configurations for clusters using the HP NetServer LXr 8000 and High Availability Disk Array Model 30/FC. Only these cabling configurations and cables are supported.
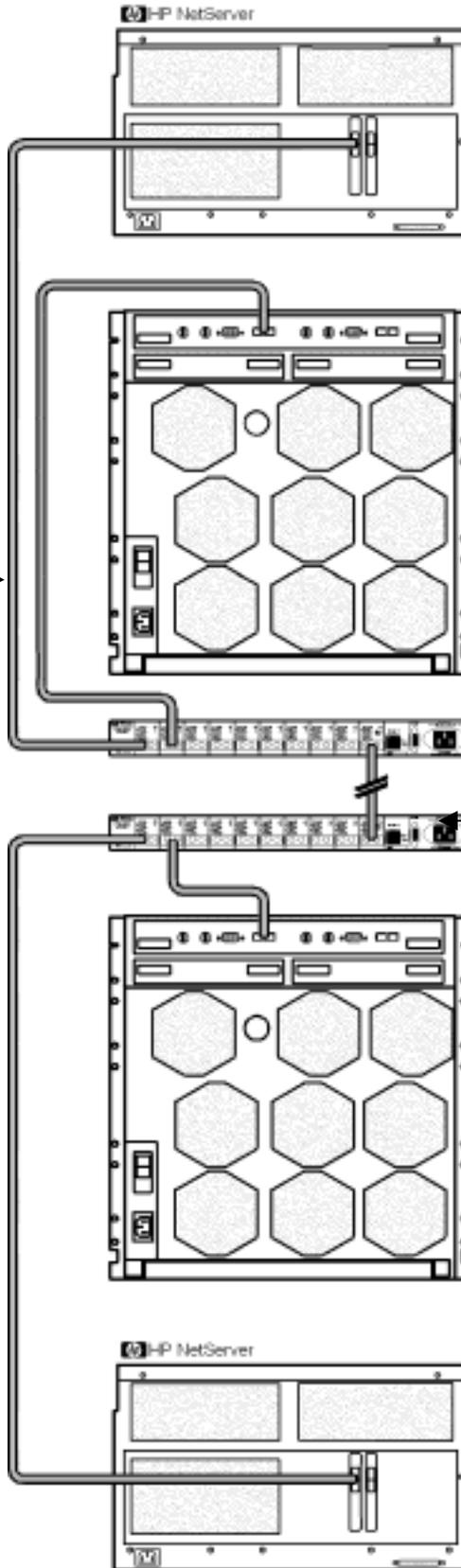
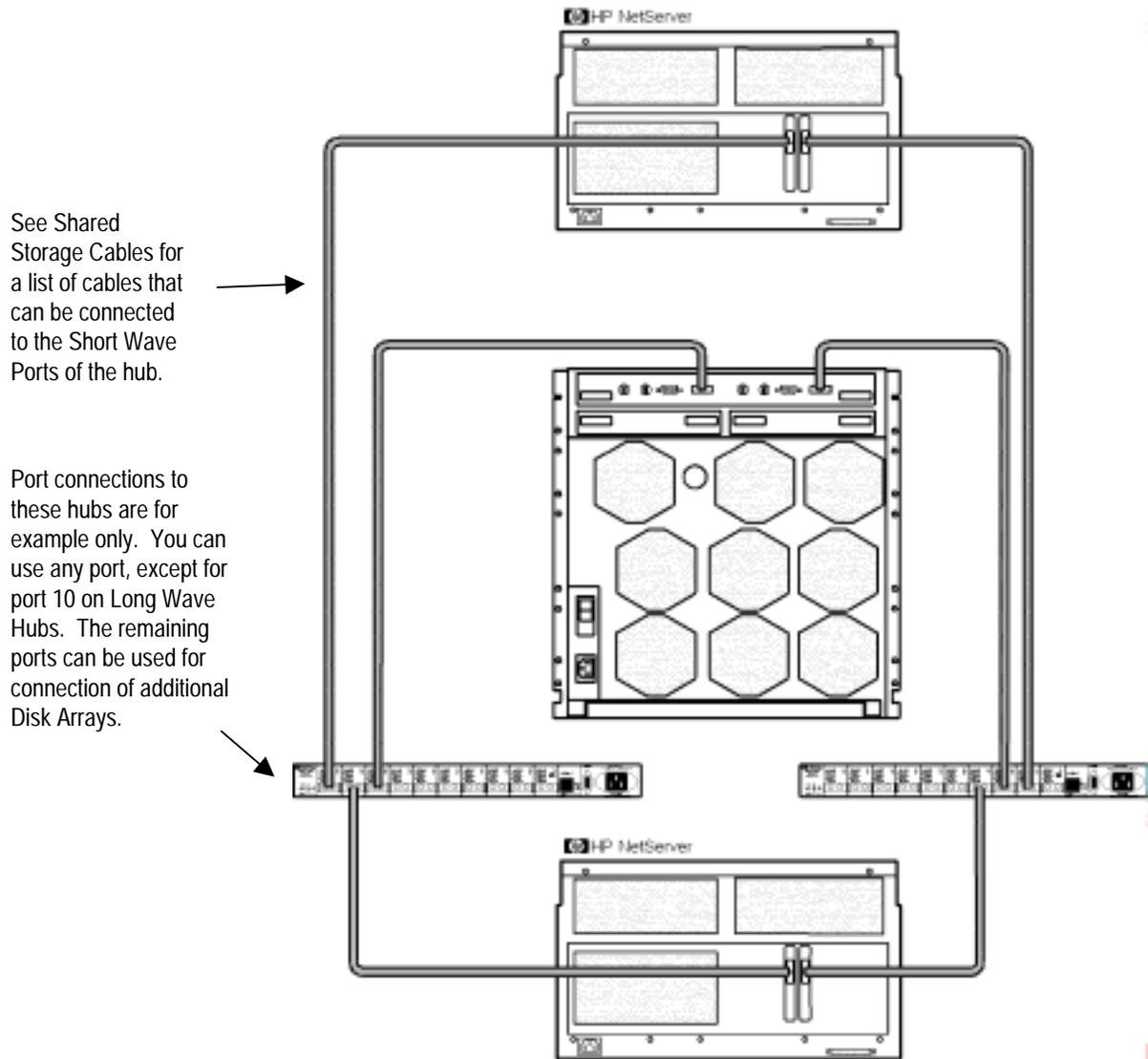See Shared Storage Cables for a list of cables that can be connected to the Short Wave Ports of the hub.

Port connections to this hub are for example only. You can use any port, except for port 10 on Long Wave Hubs. The remaining ports can be used for connection of additional Disk Arrays.

Basic Configuration with Single Fibre Channel Arbitrated Loop Hub

See Shared
Storage Cables for
a list of cables that
can be connected
to the Short Wave
Ports of the hub.

See Shared Storage
Cables for a list of
cables that can be
connected between
hubs. Port 10 is used
exclusively in Long
Wave hubs for hub-to-
hub connection.

Port connections to
these hubs are for
example only. You can
use any port, except for
port 10 on Long Wave
Hubs. The remaining
ports can be used for
connection of additional
Disk Arrays.

**Basic Configuration with Cascaded Fibre Channel Arbitrated Loop
Hubs**

See Shared Storage Cables for a list of cables that can be connected to the Short Wave Ports of the hub.

Port connections to these hubs are for example only. You can use any port, except for port 10 on Long Wave Hubs. The remaining ports can be used for connection of additional Disk Arrays.

Redundant Configuration with Single Fibre Channel Arbitrated Loop Hub

See Shared Storage Cables for a list of cables that can be connected to the Short Wave Ports of the hub.

Port connections to these hubs are for example only. You can use any port, except for port 10 on Long Wave Hubs. The remaining ports can be used for connection of additional Disk Arrays.

See Shared Storage Cables for a list of cables that can be connected between hubs. Port 10 is used exclusively in Long Wave hubs for hub-to-hub connection.

Redundant Configuration with Cascaded Fibre Channel Arbitrated Loop Hubs

Version History

13 September 1999   In Cluster specifications added a description of "Single Points Of Failure (SPOF) to clarify this property of the cluster.

21 April 1999   CPU speed was "400 MHz and higher" is "400 and 450 MHz only."

12 January 1999   Initial release.

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HP NetServer
Microsoft Cluster Installation Guide

with
Shared Storage System Supplement

Rack Storage/12FC
Rack Storage/12
Rack Storage/8
Storage System/6
HP AutoRAID Disk Array Model 12H
or
HP A3661B Model 30/FC High Availability Disk Array

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1 September 1999
(See Version History below)

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Safety Considerations

The product and related documentation must be reviewed for familiarization with safety markings and instructions before installation and operation.

Safety Symbols

A **WARNING** denotes a hazard that can cause personal injury.

A **CAUTION** denotes a hazard that can damage equipment or result in lost data.

A **NOTE** contains information that is useful in accomplishing a task and should be read before performing the associated instruction(s).

Do not proceed beyond a **WARNING** or **CAUTION** notice until you understand the hazardous conditions and have taken appropriate steps.

Grounding

The computer in which this product is installed is a safety class I product and has a protective earthing terminal. There must be an uninterruptible safety earth ground from the main power source to the product's input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, disconnect the power cord until the ground has been restored.

Servicing

Any service, adjustment, maintenance, or repair must be performed only by authorized service-trained personnel.

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Contents

Some topics in this guide are applicable to all HP NetServer clusters while others are HP NetServer and shared storage specific. A complete installation guide consists of two documents: this document (common to all HP NetServers) and the supplement for your shared storage system.

Overview

HP NetServer clusters provide increased availability solutions for critical applications. The basic cluster consists of two HP NetServer systems coupled to shared storage units. The operating system files, application files, and other files local to each node are stored on fixed or hot swap disks. Local disks are usually located internally in the system.

Both HP NetServers share external drives located in the shared storage unit(s). Shared drives are accessed using an interface card (typically referred to as the Host Bus Adapter) located in each HP NetServer unit. Both HP NetServers run Microsoft Windows NT Server, Enterprise Edition, which includes Microsoft Cluster Server software.

This guide has been designed to help you setup the HP NetServers, set up, assemble and cable the cluster, and install server and cluster software.

NOTE	This installation guide is incomplete without the supplement specific to your shared storage system. When directed by this guide, turn to the supplement to get the necessary instructions.

Version History

Date	Change
1 September 99	Added installation instructions f or a fibre channel cluster solution using the LXr 8000 with the Rack Storage/12FC and up to two optional Rack Storage/12s.
7 April 99	Corrected error (changed LHI to LH4 two places in the LH4 install procedures). Simplified the overall installation procedure by removing the need to match drive letters for the second node.
8 March 99	Added instructions for the LPr, using NetRAID local and shared storage and Revised instructions to use Navigator L.15.05 on LH4, LPr, and LXr 8000.
19 Jan. 99	Added installation instructions for the LPr.
18 Dec. 98	Added installation procedures for the HP NetServer LH 4 and LXr 8000.
20 Nov. 98	Revised the LH3 installation procedures in part 5 to allow using LH3 clusters with Model 12H and FC-30 shared storage subsystems.
5 Oct. 98	Revised part 5 – Installation to provide separate server configuration and Windows NT installation procedures. Added the LH3 installation procedure including using a NetRAID adapter for local storage.
20 July 98	Added installation instructions in part 5 for the LC3.
9 June 98	Initial release

Intended Audience

The guide is for the person who installs, administers, and troubleshoots the Microsoft Cluster Server. Hewlett-Packard assumes this person is qualified to service computer equipment and trained to recognize hazards in products with hazardous energy levels.
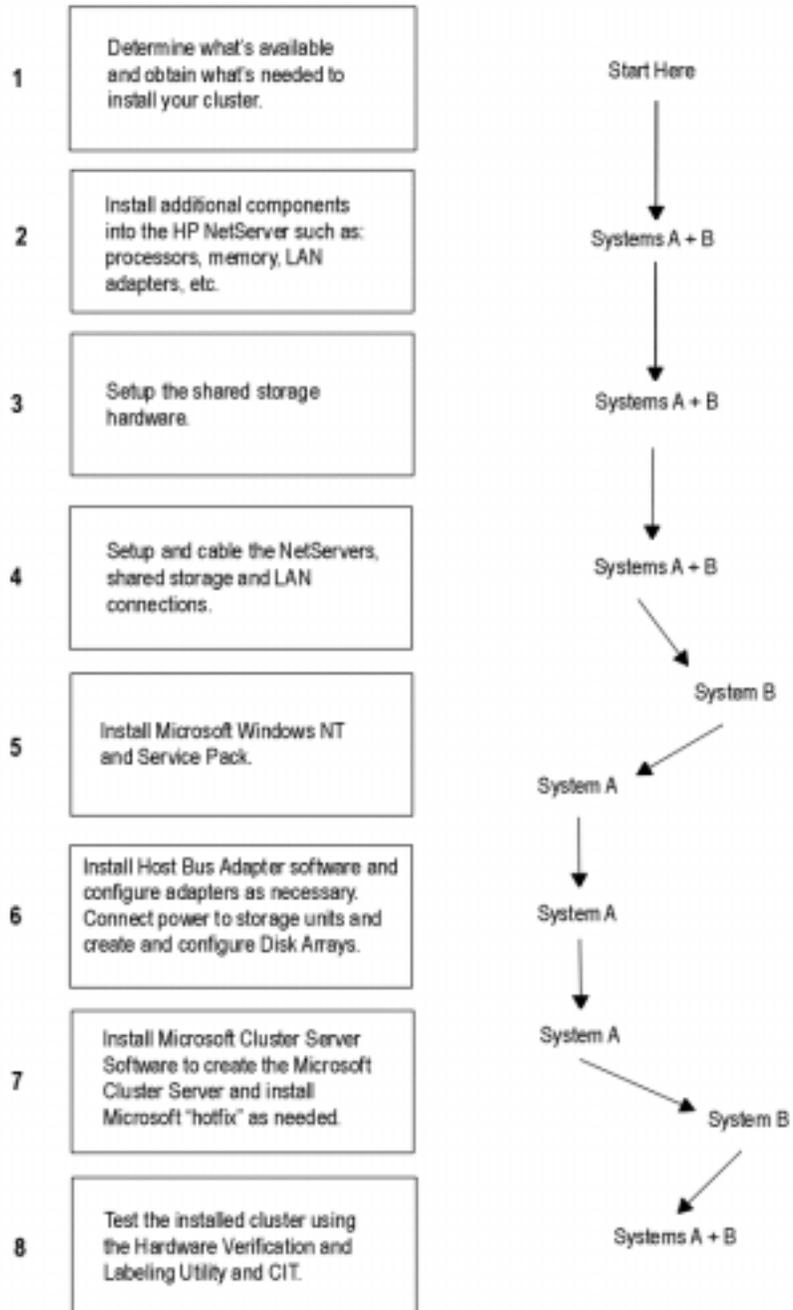
NOTE	Hewlett-Packard only supports and recommends installation of clustered HP NetServer systems using Microsoft Cluster Server software by a Microsoft or HP Cluster Certified Installer.

A Graphical Overview to Setting Up the Cluster

CAUTION	Departing from the sequence shown here can cause unnecessary work and unpredictable results.

1 — Determine what's available and obtain what's needed to install your cluster.

2 — Install additional components into the HP NetServer such as: processors, memory, LAN adapters, etc.

3 — Setup the shared storage hardware.

4 — Setup and cable the NetServers, shared storage and LAN connections.

5 — Install Microsoft Windows NT and Service Pack.

6 — Install Host Bus Adapter software and configure adapters as necessary. Connect power to storage units and create and configure Disk Arrays.

7 — Install Microsoft Cluster Server Software to create the Microsoft Cluster Server and install Microsoft "hotfix" as needed.

8 — Test the installed cluster using the Hardware Verification and Labeling Utility and CIT.

Start Here

Systems A + B

Systems A + B

Systems A + B

System B

System A

System A

System A

System B

Systems A + B

1   What's Needed

Before beginning the installation, make sure you have the following items prepared and tools and resources available.

 Some information in this part is shared storage specific. See part "1 What's Needed" of the **Shared Storage Supplement** and the Configuration Guide for your cluster. Review the supplement, refer to the Configuration Guide as directed, then return to this part.

Addresses / Names

- Minimum of three Client LAN IP addresses: one for each HP NetServer system and one for the HP NetServer cluster client LAN.

- Two Intra-cluster LAN IP addresses for the intra-cluster LAN: One for each HP NetServer system. (May use *hidden* or *intranet* addresses. See the MSCS Administrator's Guide for a discussion of IP addressing.)

NOTE	The Client LAN IP address and Intra-cluster LAN IP addresses must be on different subnets.

- Cluster and node names (limited to 15 or fewer alphanumeric characters)
- Subnet mask
- User name, password, and domain to be used for the cluster service.

Hardware

Compare the hardware you have received with your ordering documentation, such as the parts lists created by HP NetServer Order Assistant and Rack Assistant

Software

- **Microsoft Windows NT Server** (Enterprise Edition), version 4.0, which includes Windows NT, version 4.0 and Service Pack (SP). See the Configuration Guide for your cluster solution for the applicable Windows NT and SP versions and Microsoft Cluster Server installation software.

NOTE	Some HP NetServers, as stated in part "5 NetServer Software Setup," require installing Windows NT from floppy disks. To create floppy disks, on a computer running Windows 95 or NT, insert the Windows NT Server/E base CD in the CDROM drive and from the command line execute: D:\i386\winnt32.exe /ox. If needed, see, "How to Create Windows NT Boot Floppy Disks" under Support Online for the Microsoft web site.

- **Microsoft Hotfix (clusfixi.exe) for Windows NT (for SP3 only)**. This software is only needed if you are using Service Pack 3. To download.

  1. Access the Microsoft web site at http://www.microsoft.com.

  2. On the site navigator bar, select SEARCH, then search for Q147222 in the "Support & Knowledge Base" category.

  3. On the Search Results page, select Group of Hotfixes for Exchange 5.5 and IIS 4.0, then follow the ftp path to download the "clusfixi.exe" file.

NOTE	When performing this search on the Microsoft web site you may be prompted to register with Support Online. If prompted to register, you must first complete the questionnaire and then complete the search.

- **HP NetServer Navigator CD**. HP recommends you use the latest version, however you may use an earlier version if it is specified in the Configuration Guide for your cluster.

- **Cluster Installation Test**. Downloaded from the Certified Installer Corner under Install & Configure on the HP NetServer Clustering Solutions web site.

- **NIC drivers**. Download HP drivers from Software Downloads page under Install & Configure" on the HP NetServer Clustering Solutions web site.

Tools

Common hand tools plus the following:

- Torx™ T-25 driver supplied in the Rack Installation Toolkit. For rack installed clusters only.

- Portable Field Service Grounding Kit (3M® part number 8505, or equivalent).

Need More Help?

HP Information Assistant provides extensive support information and is available on the HP NetServer Online Documentation CD-ROM. Although you can access HP Information Assistant from the NetServer Navigator Main menu, HP recommends that you install it on an available Windows client connected to a printer. For more information about installing HP Information Assistant, refer to the system documentation.

The following reference materials may also be useful:

- HP NetServer Microsoft Windows NT 4.0 Installation Guide for your HP NetServer

- Processor Upgrade Instructions

These materials are available by choosing Install or Reference Books on the HP Information Assistant's Main menu.

Referenced Documents

- MSCS Administrator's Guide on the Microsoft NT 4.0 base CD under \Support\Books

- HP NetServer Configuration Guide. If not bundled with this Installation Guide downloaded from the Supported Configurations page under Plan on the HP Cluster Solutions web site

2 NetServer Hardware Setup

When HP NetServers are shipped from the factory, they are configured for stand-alone operation. The first step in creating a cluster is to install additional hardware that allows the HP NetServers to:

- Share data

- Communicate with one another

- Communicate with the LAN

CAUTION	Installing hardware requires opening the HP NetServers. HP therefore, recommends using a grounding kit. See part "1 What's Needed" for details. The kit contains a wrist strap, anti-static mat, and cable.

Install Components

NOTE	Perform the following procedure on either HP NetServer first, and then repeat the procedure for the second NetServer.

1. Gather the required hardware components for the HP NetServers and separate the components into two systems.

2. Remove the HP NetServer cover(s).

3. Install any of the following types of components that were supplied with your HP NetServers using the instructions supplied with each component. If needed, refer to HP Information Assistant for additional instructions:

   - **Processors**. If additional processors were supplied with your HP NetServers install them at this time.

   - **Main Memory**. Cluster operations require a minimum amount of main memory (RAM). Typically you do not need to add memory to your HP NetServers. However, if additional memory is required, it will be identified by the HP Order Assistant program and will be supplied. Install any additional memory that has been provided with your order. See the Configuration Guide for your cluster configuration and check that you meet the minimum memory requirements.

   - **LAN Adapters**. Install two LAN adapters in each HP NetServer. Refer to the HP NetServer Configuration Guide for your cluster and install the adapters in the PCI slots stated in the guide. If other boards are installed in these slots, remove them and install them in other slots.

   - **Internal Disks**. If provided install the local storage drives (fixed or hot swap) into the HP NetServers.

   - **Local Storage Adapter**. This adapter provides the interface to the local storage of the node. See the Configuration Guide for your cluster configuration for the PCI slot to use.

   - **Host Bus (Shared Storage) Adapters**. These adapters provide the interface to the Shared Storage Systems and must be installed in specific PCI slots. See the Configuration Guide for your cluster configuration for the HP NetServer PCI slots to use.

GO TO See instructions supplied with the component or see part "2 NetServer Hardware Setup" of the **Shared Storage Supplement** for instructions on installing these adapters.

3 Shared Storage Hardware Setup

 part "3 Shared Storage Hardware Setup" in the **Shared Storage Supplement**

4   Cluster Cabling and Setup

Setup Cluster Hardware

Non-racked clusters - Follow the Site Preparation guidelines provided in the Planning Guide under Plan on the HP NetServers Clustering Solutions web site.

Racked clusters - Follow the Road Map supplied with the system and instructions in the shared storage supplement. In addition you should have rack layouts of your system printed from the HP NetServers Rack Assistant program. If not, see HP NetServers web site to download this program.

Connect the LAN Adapters

Two sets of LAN adapters need to be connected. One set allows the cluster to communicate node-to-node over what is typically called the intra-cluster LAN. The second set allows the cluster to communicate with external clients over what is typically called the client LAN.

NOTE	See the Configuration Guide for your cluster for the PCI slots to be used for the intra-cluster and client LANs.

To connect the cluster's LAN adapters:

1. Connect the intra-cluster LAN adapter in one node to the intra-cluster LAN adapter in the other node using a crossover cable.

2. Connect the client LAN adapter in each node to the client LAN using Ethernet cables.

Connect Shared Storage & Cable the Cluster

GO TO   part "4 Cluster Cabling and Setup" in the **Shared Storage Supplement**

5   NetServer Software Setup

Follow the procedures in this part to configure the hardware and BIOS and to install Windows NT including the applicable Service Pack.

Start Here

In this part you will perform two major tasks. First you will configure the NetServer Hardware and BIOS and Install Windows NT following a procedure specific to your HP NetServer as listed below. Secondly, you will install the applicable Service Pack on the NetServer. Select your procedure from the following list:

You will…	Go to procedure for…	On page …
First	LCII	12
	LC3	13
	LH Pro	14
	LH 3	15
	LH 3 (with NetRAID local storage)	17
	LH 4	19
	LPr	21
	LPr (with NetRAID local and shared storage)	25
	LX/LXr Pro	27
	LXr 8000	28
	LXr 8000 (with fibre channel)	28
Second	Installing the Microsoft Service Pack	30

LCII

Configure NetServer Hardware and BIOS

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive of System B and restart the server.
    The server boots from the CD and displays the Navigator Main menu.

NOTE   If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 3; otherwise go to step 6.

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3. To update the BIOS, choose **Configuration Assistant**, then **Custom**, **Microsoft**, **NT 4.0**, and **No** for automated NOS installation.

4. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

5. After the server reboots return to the Navigator main menu by clicking the Back button twice on the displayed window.

6. Install a utilities partition on the local storage disk by choosing **Configuration Assistant**, then **Custom**, **Microsoft**, MS Windows **NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

7. Choose **Install/Update Utility Partition**.
    When finished, the system reboots and displays the Custom Configuration window.

Install Windows NT

1. Remove the *HP NetServer Navigator CD*, insert the first CD of the Microsoft Windows NT Server, Enterprise Edition, and exit Navigator to reboot the server.

2. Select the following options when prompted:

   - Choose the unpartitioned space and install Windows NT.

   - Choose NTFS file system.

   - When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

   - Make sure **TCP/IP Protocol** is selected.
     Other protocols may be selected in addition, but TCP/IP is required.

   - Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

LC3

Configure NetServer Hardware and BIOS

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive of System B and restart the server.
   The server boots from the CD and displays the Navigator Main menu.

NOTE	If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 3; otherwise go to step 6.

3. To update the BIOS, choose **Configuration Assistant and Installation Assistant**, then **Custom**, **Microsoft**, **NT 4.0** and **No** for automated NOS installation.

4. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

5. After the server reboots return to the Navigator main menu by clicking the Back button twice on the displayed window.

6. Install a utilities partition on the local storage disk by choosing **Configuration Assistant and Installation Assistant**, then **Custom**, **Microsoft**, MS Windows **NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

7. Choose **Install/Update Utility Partition**.
   When finished, the system reboots and displays the Custom Configuration window.

Install Windows NT

1. Remove the *HP NetServer Navigator CD,* insert the first CD of the Microsoft Windows NT Server, Enterprise Edition, and exit Navigator to reboot the server.

2. Select the following options when prompted:

   - Choose the unpartitioned space and install Windows NT.

   - Choose NTFS file system.

   - When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

   - Make sure **TCP/IP Protocol** is selected.
     Other protocols may be selected in addition, but TCP/IP is required.

   - Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

LH Pro

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive of System B and restart the server.
   The server boots from the CD and displays the Navigator Main menu.

NOTE	If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 3; otherwise go to step 6.

3. To update the BIOS, choose **Configuration Assistant**, then **Custom**, **Microsoft**, MS Windows **NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

4. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

5. After the server reboots return to the Navigator main menu by clicking the Back button twice on the displayed window.

6. From the Navigator Main menu, choose **NetServer Utilities**, then **EISA Configuration Utility**.

7. In the EISA Configuration Utility, disable the **Embedded IDE Hard Disk Controller**.
   (The embedded IDE controller is not used on HP NetServer systems.)

8. Save and exit the EISA Configuration Utility.
   The Utility saves your configuration data, restarts the HP NetServer and reloads the *HP Navigator CD-ROM*.

9. Install a utility partition on the local storage disk by choosing **Configuration Assistant**, then **Custom**, **Microsoft**, MS Windows **NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

10. Choose **Install/Update Utility Partition**.
    When finished, the system reboots and displays the Custom Configuration window.

Install Windows NT

1. Remove the *HP NetServer Navigator CD*, insert the first CD of the Microsoft Windows NT Server, Enterprise Edition, and exit Navigator to reboot the server.

2. Select the following options when prompted:

   - Choose the unpartitioned space and install Windows NT.

   - Choose NTFS file system

   - When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

   - Make sure **TCP/IP Protocol** is selected.
     Other protocols may be selected in addition, but TCP/IP is required.

   - Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

LH 3

These procedures provide instructions for servers using NetRAID, AutoRAID Model 12H, and Model 30/FC shared storage solutions.

NOTE	If you are use NetRAID adapters for both shared and local storage go to the next procedure, LH3 (with NetRAID Local and Shared Storage) on page 17.

Configure NetServer Hardware and BIOS

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive and restart the server.

3. During reboot enter the Setup Utility by pressing F2.

4. Select **User Preferences** and then the **LH4 Integrated NetRAID** setting you want to use.
   If you are using NetRAID for shared storage, disable the **LH4 Integrated HP NetRAID**.
   It must be disabled otherwise it will conflict with the HP NetRAID adapter used for shared storage.

5. Exit the Setup Utility.
   The server reboots. If you have special NetServer local SCSI bus options enter the Symbios utility, by pressing Ctrl+C at the Symbios boot banner during reboot and set the options you need; otherwise allow the server to reboot. The server boots from the CD and displays the Navigator Main menu.

NOTE	If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 6; otherwise go to step 9.

6. To update the BIOS, choose **Configuration Assistant and Installation Assistant**, then **Custom**, **Microsoft**, **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

7. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

8. After the server reboots, return to the Navigator main menu by clicking the Back button twice on the displayed window.

9. From the Navigator main menu, install a utility partition on the local storage disk by choosing **Configuration Assistant and Installation Assistant**, then **Custom**, **Microsoft**, **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

10. Choose **Install/Update Utility Partition**.
    When finished, the system reboots and displays the Custom Configuration window.

11. Make an *NT 4.0 Drivers* disk by choosing **Create Driver Diskette(s), Execute,** and following the prompts. Label the floppy disk *NT 4.0 Drivers*.

Install Windows NT

NOTE	Windows NT <u>must</u> be installed from floppy disks, not the CD, so that the mass storage drivers will be loaded correctly. If you have not created a set of Windows NT boot floppy disks, see Software in part "1 What's Needed" for additional information.

1. Remove the *HP NetServer Navigator CD,* insert the boot floppy for Windows NT4.0, and exit Navigator to reboot the server.

2. When Setup prompts to detect mass storage devices, skip detection and manually specify the mass storage drivers:

   • The drivers are loaded from the *NT 4.0 Drivers* floppy disk you created from the Navigator CD.

   • First, load the driver for the device you want to boot from. For drives in the LH 3 internal bays this will normally be the embedded SCSI Symbios driver.

   • Secondly, load the IDE driver, since the CD drive is on the IDE bus.

   • Finally, load any other mass storage drivers you need. If you are using NetRAID for shared storage do not load the HP NetRAID driver at this time. It will be loaded later.

3. Continue the installation, inserting floppy disks #2 and #3 and select the following options when prompted:

   • Choose the unpartitioned space and install Windows NT.

   • Choose NTFS file system

   • When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

   • Make sure **TCP/IP Protocol** is selected.
     Other protocols may be selected in addition, but TCP/IP is required.

   • If you are using two HP D5013A NICs, when prompted for TCP/IP Properties:

     Make sure adapter [2] is highlighted and specify its IP address and subnet mask. This will be the LAN adapter for the intra-cluster LAN.

     Select adapter [1] and specify its IP address and subnet mask. This will be the LAN adapter for the client LAN.

     Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

| NOTE | The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets. |

4. Once the NT installation is complete, the D5013A NIC drivers must be manually set to the correct LAN speed. Log on and from the start menu select: **Settings**, **Control Panel**, **Network**, and **Adapters**. For each D5013A adapter, select **Properties** then **Settings** and set the network speed to the appropriate setting (either 10 Mbps or 100 Mbps) for your network. The intra-cluster LAN should be set to 100 Mbps. Do not use the Auto setting.

LH 3 (with NetRAID Local and Shared Storage)

A NetRAID adapter may only be used for either shared storage or local storage; one adapter may not be used for both. To use NetRAID adapters for both shared and local storage, you must use two adapters.

Configure NetServer Hardware and BIOS

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive and restart the server.

3. During reboot enter the Setup Utility by pressing F2.

4. Using the Setup Utility disable the LH3 Integrated NetRAID.
    Integrated NetRAID is not used in a cluster because it conflicts with the HP NetRAID adapter used for shared storage.

| NOTE | Auto IRQ assignments can give IRQ conflicts. If this occurs manually set the IRQ assignments. In **Configuration**, **PCI Slot Devices**, **PCI IRQ Locking**, assign the IRQs to the cards. The following assignments work for the standard configuration: |

Card	PCI Slot	IRQ
NIC	P1	9
NIC	P2	9
NetRAID	P7	5
NetRAID	P8	5
-	SCSI A	10 (or disabled)
-	SCSI B	10 (or disabled)

Disable SCSI A and SCSI B if they are not used!
Set any other options as you desire.

5. Exit the Setup Utility
    The server reboots. If you have special NetServer local SCSI bus options enter the Symbios utility, by pressing Ctrl+C at the Symbios boot banner during reboot and set the options you need; otherwise allow the server to reboot. The server boots from the CD and displays the Navigator Main menu.

| NOTE | If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 6; otherwise go to step 9. |

6. To update the BIOS, choose **Configuration Assistant and Installation Assistant**, then **Custom**, **Microsoft**, **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

7. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

8. After the server reboots, return to the Navigator main menu by clicking the Back button twice on the displayed window.

9. From the Navigator main menu select, **Configuration Assistant**, then **Custom**, **Microsoft**, **MS Windows NT 4.0 Enterprise Edition**, and **No.** Check the advisories in Configuration Advisor for IRQ conflicts and other problems. Click **Continue**.

10. Define the local storage RAID arrays. Select **Configure Disk Array** and use HP NetRAID Assistant to define the arrays. Be sure to define the arrays for the local storage adapter (Adapter_0), not the shared storage adapter (Adapter_1).

NOTE	DO NOT define the shared storage arrays at this time. They will be defined later.

11. From the Navigator main menu install a utility partition on the local storage disk by choosing **Configuration Assistant and Installation Assistant**, then **Custom**, **Microsoft**, **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

12. Choose **Install/Update Utility Partition**.
    When finished, the system reboots and displays the Custom Configuration window.

13. Make an *NT 4.0 Drivers* floppy disk by choosing **Create Driver Diskette(s), Execute,** and following the prompts. Label the floppy disk *NT 4.0 Drivers*.

Copy the NetRAID Driver for Clusters

Copy the "Mraidnt.sys" file from the *NR Firmware & Driver* floppy disk to the "\Netraid" directory on the *NT 4.0 Drivers* floppy disk you created in step 13 above (page 18). You can do this either by booting the server on which you are installing to DOS and copying the file, or by copying this file using another computer:
This will overwrite the NetRAID single system driver already there with the NetRAID cluster driver.

NOTE	Do not copy the oemsetup.inf file on the *NR Firmware & Driver* floppy disk.

Install Windows NT

NOTE	Windows NT <u>must</u> be installed from floppy disks, not the CD, so that the mass storage drivers will be loaded correctly. If you have not created a set of Windows NT boot floppy disks, see Software in part "1 What's Needed" for additional information.

1. Insert the boot floppy for Windows NT4.0 and exit Navigator to reboot the server.

2. When Setup prompts to detect mass storage devices, skip detection and manually specify the mass storage drivers:

3. Load drivers using the *NT 4.0 Drivers* floppy disk you created in step 13 above (page 18).

   - Load the driver for the device you want to boot from. This will be the HP NetRAID Adapter Driver.

   - Load the IDE driver, since the CD drive is on the IDE bus.

   - Load any other mass storage drivers you need. If you are using the embedded SCSI channels, load the Symbios driver at this time.

4. Continue the installation and select the following options when prompted:

   - Choose the unpartitioned space and install Windows NT.

   - Choose NTFS file system

- When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

- Make sure **TCP/IP Protocol** is selected.
  Other protocols may be selected in addition, but TCP/IP is required.

- If you are using two HP D5013A NICs, when prompted for TCP/IP Properties:

  Make sure adapter [2] is highlighted and specify its IP address and subnet mask. This will be the LAN adapter for the intra-cluster LAN.

  Select adapter [1] and specify its IP address and subnet mask. This will be the LAN adapter for the client LAN.

  Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

5. Once the NT installation is complete, the D5013A NIC drivers must be manually set to the correct LAN speed. Log on and from the start menu select: **Settings**, **Control Panel**, **Network**, and **Adapters**. For each D5013A adapter, select **Properties** then **Settings** and set the network speed to the appropriate setting (either 10 Mbps or 100 Mbps) for your network. The intra-cluster LAN should be set to 100 Mbps. Do not use the Auto setting.

LH 4

These procedures provide instructions for servers using NetRAID, AutoRAID Model 12H, and Model 30/FC shared storage solutions.

Configure NetServer Hardware and BIOS

6. Make sure you power down System A and power up System B.

7. Insert the HP NetServer Navigator CD in the CD-ROM drive and restart the server.

8. During reboot enter the Setup Utility by pressing F2.

9. Select **User Preferences** and then the **LH4 Integrated NetRAID** setting you want to use.
   If you are using NetRAID for shared storage, disable the **LH4 Integrated HP NetRAID**.
   It must be disabled otherwise it will conflict with the HP NetRAID adapter used for shared storage.

10. Exit the Setup Utility (F10, Save, and Exit).
    The server reboots. If you have special NetServer local SCSI bus options enter the Symbios utility, by pressing Ctrl+C at the Symbios boot banner during reboot and set the options you need; otherwise allow the server to reboot. The server boots from the CD and displays the Navigator Main menu.

NOTE	If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 6; otherwise go to step 9.

11. To update the BIOS, choose **Configuration Assistant and Installation Assistant**, then **Custom**, **Microsoft**, **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

12. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

13. After the server reboots, return to the Navigator main menu by clicking the Back button twice on the displayed window.

14. From the Navigator main menu, install a utility partition on the local storage disk by choosing **Configuration Assistant and Installation Assistant**, **Custom**, **Microsoft**, then either:

    - **MS Windows NT4.0 Enterprise Edition Cluster Server** if using Navigator if L.15.05 or later.

    - **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation if using Navigator L.15.04 or earlier.

15. Choose **Install/Update Utility Partition**.
    When finished, the system reboots and displays the Custom Configuration window.

16. Make a *NT4.0 Drivers* floppy disk by choosing **Create Driver Diskette(s), Execute,** and following the prompts. Label the floppy disk *NT 4.0 Drivers*.

17. Return to the Navigator main menu by clicking the Back button three times.

Install Windows NT

NOTE	Windows NT <u>must</u> be installed from floppy disks, not the CD, so that the mass storage drivers will be loaded correctly. If you have not created a set of Windows NT boot floppy disks, see Software in part "1 What's Needed" in the installation guide supplement for additional information.

18. Insert the boot floppy disk for Windows NT4.0 and exit Navigator to reboot the server.

19. When Windows NT Setup prompts to detect mass storage devices, skip detection and manually specify the mass storage drivers:

    - The drivers are loaded from the *NT 4.0 Drivers* floppy disk you created from the Navigator CD.

    - First, load the driver for the device you want to boot from. For drives in the LH 4 internal bays this will normally be the embedded SCSI Symbios driver.

    - Secondly, load the IDE driver, since the CD drive is on the IDE bus.

    - Finally, load any other mass storage drivers you need. If you are using NetRAID for shared storage do not load the HP NetRAID driver at this time. It will be loaded later.

20. Continue the installation using floppy disks#2 and #3 and select the following options when prompted:

    - Choose the unpartitioned space and install Windows NT.

    - Choose NTFS file system

    - When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

    - Make sure **TCP/IP Protocol** is selected.
      Other protocols may be selected in addition, but TCP/IP is required.

- If you are using two HP D5013A NICs, when prompted for TCP/IP Properties:

  Make sure adapter [2] is highlighted and specify its IP address and subnet mask. This will be the LAN adapter for the intra-cluster LAN.

  Select adapter [1] and specify its IP address and subnet mask. This will be the LAN adapter for the client LAN.

  Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

21. Once the NT installation is complete, the D5013A NIC drivers must be manually set to the correct LAN speed. Log on and from the start menu select: **Settings**, **Control Panel**, **Network**, and **Adapters**. For each D5013A adapter, select **Properties** then **Settings** and set the network speed to the appropriate setting (either 10 Mbps or 100 Mbps) for your network. The intra-cluster LAN should be set to 100 Mbps. Do not use the Auto setting.

LPr

These procedures provide instructions for servers using NetRAID and AutoRAID shared storage solutions.

NOTE	If you are use NetRAID adapters for both shared and local storage go to the next procedure, LPr (with NetRAID Local and Shared Storage) on page 25.

Configure NetServer Hardware and BIOS

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive and restart the server.

3. If you have special NetServer local SCSI bus options enter the Symbios utility by pressing Ctrl+C at the Symbios boot banner during boot and set the options you need; otherwise allow the server to boot. The server boots from the CD and displays the Navigator Main Menu.

NOTE	If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 4; otherwise go to step 6.

4. To update the BIOS, choose **NetServer Utilities | More NetServer Utilities | BIOS Update Utility**. Select **Execute** and follow the screen prompts to update the BIOS.

5. After the server reboots, return to the Navigator main menu by clicking the Back button twice on the displayed window.

6. From the Navigator main menu, install a utility partition on the local storage disk by choosing **Configuration Assistant and Installation Assistant**, **Custom**, **Microsoft**, then either:

   - **MS Windows NT4.0 Enterprise Edition Cluster Server** if using Navigator if L.15.05 or later.

   - **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation if using Navigator L.15.04 or earlier.

7. Choose **Install/Update Utility Partition** and **Execute**.
    When finished, the system reboots and displays the Custom Configuration window.

8. Make an *NT 4.0 Drivers* floppy disk by choosing **Create Driver Diskette(s), Execute,** and following the prompts. Label the floppy disk *NT 4.0 Drivers*.

9. Press the **Back** button three times to return the Navigator Main Menu.

10. If you are using a NetRAID adapter for either shared or local storage, create a set of installation floppy disks for NetRAID Assistant by choosing **NetServer Utilities | Diskette Library**. Select **NetRAID Assistant for WindowsNT** and **Windows95** from the list and then the **Execute** button. Follow the instructions to create the NetRAID Assistant installation floppy disks. Label the floppy disks *HP NetRAID Assistant 1* and *HP NetRAID Assistant 2*.

Install Windows NT

NOTE	Windows NT <u>must</u> be installed from floppy disks, not the CD, so that the mass storage drivers will be loaded correctly. If you have not created a set of Windows NT boot floppy disks, see Software in part "1 What's Needed" for additional information.

1. Remove the *HP NetServer Navigator CD,* insert the boot floppy for Windows NT4.0, and exit Navigator to reboot the server.

2. When Setup prompts to detect mass storage devices, skip detection and manually specify the mass storage drivers:

    - The drivers are loaded from the *NT 4.0 Drivers* floppy disk you created from the Navigator CD.

    - First, load the driver for the device you want to boot from. For drives in the LPr internal bays this will normally be the embedded SCSI Symbios driver on the drivers disk. Select "SCSI Symbios driver for the HP NetServer LPr."

    - Secondly, load the IDE driver, since the CD drive is on the IDE bus.

    - Finally, load any other mass storage drivers you need. If you are using NetRAID for shared storage do not load the HP NetRAID driver at this time. It will be loaded later.

3. Continue the installation, inserting floppy disk #3 and select the following options when prompted:

    - Choose the unpartitioned space and install Windows NT.

    - Choose NTFS file system

    - When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

    - Make sure **TCP/IP Protocol** is selected.
      Other protocols may be selected in addition, but TCP/IP is required.

    - If you are using two HP D5013A NICs, when prompted for TCP/IP Properties:

      Make sure adapter [2] is highlighted and specify its IP address and subnet mask. This will be the LAN adapter for the intra-cluster LAN.

      Select adapter [1] and specify its IP address and subnet mask. This will be the LAN adapter for the client LAN.

      Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

4. Once the NT installation is complete, the D5013A NIC drivers must be manually set to the correct LAN speed. Log on and from the start menu select: **Settings**, **Control Panel**, **Network**, and **Adapters**. For each D5013A adapter, select **Properties** then **Settings** and set the network speed to the appropriate setting (either 10 Mbps or 100 Mbps) for your network. The intra-cluster LAN should be set to 100 Mbps. Do not use the Auto setting.

LPr (with NetRAID Local and Shared Storage)

A NetRAID adapter may only be used for either shared storage or local storage; one adapter may not be used for both. To use NetRAID adapters for both shared and local storage, you must use two adapters.

Configure NetServer Hardware and BIOS

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive and restart the server.

3. If you have special NetServer local SCSI bus options enter the Symbios utility by pressing Ctrl+C at the Symbios boot banner during boot and set the options you need; otherwise allow the server to boot. The server boots from the CD and displays the Navigator Main Menu.

NOTE	If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 4; otherwise go to step 6.

4. To update the BIOS, choose **NetServer Utilities | More NetServer Utilities | BIOS Update Utility**. Select **Execute** and follow the screen prompts to update the BIOS.

5. After the server reboots, return to the Navigator main menu by clicking the Back button twice on the displayed window.

6. From the Navigator main menu, install a utility partition on the local storage disk by choosing **Configuration Assistant and Installation Assistant**, **Custom**, **Microsoft**, then either:

   - **MS Windows NT4.0 Enterprise Edition Cluster Server** if using Navigator if L.15.05 or later.

   - **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation if using Navigator L.15.04 or earlier.

7. Define the local storage RAID arrays. Select **Configure Disk Array** and use HP NetRAID Assistant to define the arrays. Be sure to define the arrays for the local storage adapter (Adapter_0), not the shared storage adapter (Adapter_1).

NOTE	DO NOT define the shared storage arrays at this time. They will be defined later.

8. Exit HP NetRAID Assistant. The server will reboot.
   During the reboot, at the NetRAID banner press **<Ctrl><M>** to enter the NetRAID Express utility. From the Management Menu, check that the BIOS is enabled. If it is not, enable it.

9. Exit the NetRAID Express utility and reboot. Navigator will return to the Custom Configuration screen. Install a utility partition on the local storage disk by choosing **Install/Update Utility Partition**.
   After installing the utility partition, Navigator returns to the Custom Configuration screen.

10. Make an *NT 4.0 Drivers* floppy disk by choosing **Create Driver Diskette(s), Execute,** and following the prompts. Label the floppy disk *NT 4.0 Drivers*.

11. Press the **Back** button three times to return the Navigator Main Menu.

12. Create a set of installation floppy disks for NetRAID Assistant by choosing **NetServer Utilities | Diskette Library**. Select **NetRAID Assistant for WindowsNT** and **Windows95** from the list and then the **Execute** button. Follow the instructions to create the NetRAID Assistant installation floppy disks. Label the floppy disks *HP NetRAID Assistant 1* and *HP NetRAID Assistant 2*.

Install Windows NT

NOTE	Windows NT <u>must</u> be installed from floppy disks, not the CD, so that the mass storage drivers will be loaded correctly. If you have not created a set of Windows NT boot floppy disks, see Software in part "1 What's Needed" for additional information.

1. Remove the Navigator CD, insert the boot floppy for Windows NT4.0, and exit Navigator to reboot the server.

2. When Setup prompts to detect mass storage devices, skip detection and manually specify the mass storage drivers:

3. Load drivers using the *NetRAID-3Si Cluster Firmware and Driver* floppy disk you created in part 1 "What's Needed" and the *NT 4.0 Drivers* floppy disk you created in step 10 above of this procedure.

   - Load the driver for the device you want to boot from. This will be the HP NetRAID Adapter Driver.

     If you are using a NetRAID-3Si Adapter for shared storage, load this driver from the *NetRAID-3Si Cluster Firmware and Driver* floppy disk. Be sure to use the driver version specified for shared storage in the Configuration Guide, since this driver is used for both the NetRAID local storage adapter and the NetRAID-3Si shared storage adapter.

   - Load the IDE driver from the *NT 4.0 Drivers* floppy disk, since the CD drive is on the IDE bus.

   - Load any other mass storage drivers you need. If you are using the embedded SCSI channel, load the Symbios driver from the *NT 4.0 Drivers* floppy disk at this time.

4. Continue the installation and select the following options when prompted:

   - Choose the unpartitioned space and install Windows NT.

   - Choose NTFS file system

   - When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

   - Make sure **TCP/IP Protocol** is selected.
     Other protocols may be selected in addition, but TCP/IP is required.

   - If you are using two HP D5013A NICs, when prompted for TCP/IP Properties:

     Make sure adapter [2] is highlighted and specify its IP address and subnet mask. This will be the LAN adapter for the intra-cluster LAN.

     Select adapter [1] and specify its IP address and subnet mask. This will be the LAN adapter for the client LAN.

     Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

5. Once the NT installation is complete, the D5013A NIC drivers must be manually set to the correct LAN speed. Log on and from the start menu select: **Settings**, **Control Panel**, **Network**, and **Adapters**. For each D5013A adapter, select **Properties** then **Settings** and set the network speed to the appropriate setting (either 10 Mbps or 100 Mbps) for your network. The intra-cluster LAN should be set to 100 Mbps. Do not use the Auto setting.

LX/LXr Pro

Configure NetServer Hardware and BIOS

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive of System B and restart the server. The server boots from the CD and displays the Navigator Main menu.

NOTE	If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 3; otherwise go to step 6.

3. To update the BIOS, choose **Configuration Assistant**, then **Custom**, **Microsoft**, MS Windows **NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

4. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

5. After the server reboots return to the Navigator main menu by clicking the Back button twice on the displayed window.

6. From the Navigator Main menu, choose **NetServer Utilities**, then **EISA Configuration Utility**.

7. At the Utility window select **Step 3 - View or Edit Details** and:

   - Make sure **MP Spec Version** is set to **V1.4**.

   - Disable the on-board IDE Hard Disk Controller by scrolling to **On-board IDE Hard Disk Controller**, pressing Enter, and choosing **Disable**.
     The embedded IDE controller is not used on the HP NetServer LX and LXr Pro.

8. Save and exit the EISA Configuration Utility.
   The utility saves the configuration data, restarts the server, and reloads the HP NetServer Navigator CD.

9. Install a utility partition on the local storage disk by choosing **Configuration Assistant**, then **Custom**, **Microsoft**, MS Windows **NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

10. Choose **Install/Update Utility Partition**.
    When finished, the system reboots and displays the Custom Configuration window.

Install Windows NT

1. Remove the *HP NetServer Navigator CD*, insert the first CD of the Microsoft Windows NT Server, Enterprise Edition, and exit Navigator to reboot the server.

2. Select the following options when prompted:

   - Choose the unpartitioned space and install Windows NT.

   - Choose NTFS file system

- When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

- Make sure **TCP/IP Protocol** is selected.
  Other protocols may be selected in addition, but TCP/IP is required.

- Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

LXr 8000

These procedures provide instructions for servers using NetRAID, AutoRAID Model 12H, and Model 30/FC shared storage solutions

Configure NetServer Hardware and BIOS

1. Make sure you power down System A and power up System B.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive and restart the server.

NOTE	If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 3; otherwise go to step 6.

3. To update the BIOS, choose **Configuration Assistant**, then **Custom**, **Microsoft**, **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

4. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

5. After the server reboots, return to the Navigator main menu by clicking the Back button twice on the displayed window.

6. From the Navigator main menu, install a utility partition on the local storage disk by choosing **Configuration Assistant and Installation Assistant**, **Custom**, **Microsoft**, then either:

   - **MS Windows NT4.0 Enterprise Edition Cluster Server** if using Navigator if L.15.05 or later.

   - **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation if using Navigator L.15.04 or earlier.

7. Choose **Install/Update Utility Partition**.
   When finished, the system reboots and displays the Custom Configuration window.

8. Make an *NT 4.0 Drivers* floppy disk by choosing **Create Driver Diskette(s), Execute**, and following the prompts. Label the floppy disk *NT 4.0 Drivers*.

Install Windows NT

NOTE	Windows NT <u>must</u> be installed from floppy disks, not the CD, so that the mass storage drivers will be loaded correctly. If you have not created a set of Windows NT boot floppy disks, see Software in part "1 What's Needed" for additional information.

1. Insert the boot floppy disk for Windows NT4.0 and exit Diagnostic Assistant to reboot the server.

2. When Setup prompts to detect mass storage devices, skip detection and manually specify the mass storage drivers:

    - The drivers are loaded from the *NT 4.0 Drivers* floppy disk you created from the Navigator CD.

    - First, load the driver for the device you want to boot from. For drives in the LXr 8000 internal bays this will normally be the embedded SCSI Symbios driver.

    - Secondly, load the IDE driver, since the CD drive is on the IDE bus.

    - Finally, load any other mass storage drivers you need. If you are using NetRAID for shared storage do not load the HP NetRAID driver at this time. It will be loaded later.

3. Continue the installation and select the following options when prompted:

    - Choose the unpartitioned space and install Windows NT.

    - Choose NTFS file system

    - When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

    - Make sure **TCP/IP Protocol** is selected.
      Other protocols may be selected in addition, but TCP/IP is required.

    - If you are using two HP D5013A NICs, when prompted for TCP/IP Properties:

      Make sure adapter [1] is highlighted and specify its IP address and subnet mask. This will be the LAN adapter for the intra-cluster LAN.

      Select adapter [2] and specify its IP address and subnet mask. This will be the LAN adapter for the client LAN.

      Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

4. Once the NT installation is complete, the D5013A NIC drivers must be manually set to the correct LAN speed. Log on and from the start menu select: **Settings**, **Control Panel**, **Network**, and **Adapters**. For each D5013A adapter, select **Properties** then **Settings** and set the network speed to the appropriate setting (either 10 Mbps or 100 Mbps) for your network. The intra-cluster LAN should be set to 100 Mbps. Do not use the Auto setting.

LXr 8000 (with Fibre Channel)

These procedures provide instructions for servers using Fibre Channel shared storage solutions (HP Rack Storage/12FC.

Configure NetServer Hardware and BIOS

1. System A and System B can both be powered on.

2. Insert the HP NetServer Navigator CD in the CD-ROM drive and restart the server.

3. During reboot enter the Setup Utility by pressing F2.

4. Select **User Preferences** and then the **LH4 Integrated NetRAID** setting you want to use.

5. Exit the Setup Utility (F10, Save, and Exit).
   The server reboots. If you have special NetServer local SCSI bus options enter the Symbios utility, by pressing Ctrl+C at the Symbios boot banner during reboot and set the options you need; otherwise allow the server to reboot. The server boots from the CD and displays the Navigator Main menu.

NOTE   If prompted that the HP NetServer Navigator BIOS is a newer version, choose **Continue** and go to step 6; otherwise go to step 9.

---

6. To update the BIOS, choose **Configuration Assistant and Installation Assistant**, then **Custom**, **Microsoft**, **MS Windows NT 4.0 Enterprise Edition**, and **No** for automated NOS installation.

7. Select **Update**, then **Execute**. Follow screen prompts to update the BIOS.

8. After the server reboots, return to the Navigator main menu by clicking the Back button twice on the displayed window.

9. From the Navigator main menu, install a utility partition on the local storage disk by choosing **Configuration Assistant and Installation Assistant**, **Custom**, **Microsoft**, then **MS Windows NT4.0 Enterprise Edition Cluster Server**.

10. Choose **Install/Update Utility Partition**.
    When finished, the system reboots and displays the Custom Configuration window.

11. Make a *NT4.0 Drivers* floppy disk by choosing **Create Driver Diskette(s), Execute,** and following the prompts. Label the floppy disk *NT 4.0 Drivers*.

12. Return to the Navigator main menu by clicking the Back button three times.

Install Windows NT

NOTE   Windows NT <u>must</u> be installed from floppy disks, not the CD, so that the mass storage drivers will be loaded correctly. If you have not created a set of Windows NT boot floppy disks, see Software in part "1 What's Needed" of the installation guide supplement for additional information.

---

1. Insert the boot floppy disk for Windows NT4.0 and exit Navigator to reboot the server.

2. When Windows NT Setup prompts to detect mass storage devices, skip detection and manually specify the mass storage drivers:

   - The drivers are loaded from the *NT 4.0 Drivers* floppy disk you created from the Navigator CD.

- First, load the driver for the device you want to boot from. For drives in the LH 4 internal bays this will normally be the embedded SCSI Symbios driver or embedded NetRAID.

- Secondly, load the IDE driver, since the CD drive is on the IDE bus.

- Finally, load any other mass storage drivers you need. If you are using the Fibre Channel HBA for shared storage do not load the HP Fibre Channel driver at this time. It will be loaded later.

3. Continue the installation using floppy disks#2 and #3 and select the following options when prompted:

- Choose the unpartitioned space and install Windows NT.

- Choose NTFS file system

- When prompted to search for a Network Adapter, load NIC drivers for both the intra-cluster and the client LAN. Be sure to load the correct intra-cluster LAN driver version as specified in the Configuration Guide for your cluster. If you are using two HP D5013A NICs, load the driver twice, once for the intra-cluster NIC and once for the client NIC.

- Make sure **TCP/IP Protocol** is selected.
  Other protocols may be selected in addition, but TCP/IP is required.

- If you are using two HP D5013A NICs, when prompted for TCP/IP Properties:

  Make sure adapter [2] is highlighted and specify its IP address and subnet mask. This will be the LAN adapter for the intra-cluster LAN.

  Select adapter [1] and specify its IP address and subnet mask. This will be the LAN adapter for the client LAN.

  Set TCP/IP Properties for DNS, WINS Address, etc. at this time.

NOTE	The Client LAN IP addresses and Intra-cluster LAN IP addresses must be on different subnets.

4. Once the NT installation is complete, the D5013A NIC drivers must be manually set to the correct LAN speed. Log on and from the start menu select: **Settings**, **Control Panel**, **Network**, and **Adapters**. For each D5013A adapter, select **Properties** then **Settings** and set the network speed to the appropriate setting (either 10 Mbps or 100 Mbps) for your network. The intra-cluster LAN should be set to 100 Mbps. Do not use the Auto setting.

Part "6 Shared Storage Software Setup" in the **Shared Storage Supplement** and start with Install Fibre Channel HBA Driver.

Install Service Pack for All HP NetServers

Refer to the Configuration Guide for your cluster configuration and install the applicable Microsoft Service Pack (SP3 or SP4). Do not install the Hot Fix associated with Service Pack 3 at this time.

NOTE	<u>Do not</u> install the Microsoft Cluster Server Software (MSCS) at this time.

NOTE	After completing these procedures, power down System B and power up System A. Repeat all of the procedures in this part for System A.

For **Fibre Channel solutions using the Rack Storage/12FC** simply reboot System B and repeat the procedures on Systems A. Both systems can be powered up.

6   Shared Storage Software Setup

Use these procedures to install host bus adapter (interface) software, create the arrays and array file systems.

Shared Storage Setup

GO TO Part "6 Shared Storage Software Setup" in the **Shared Storage Supplement.** For Fibre Channel solutions go to Configure the Storage Devices using FCArray Assistant in the supplement

Create the Array File Systems

Use the instructions below and Windows NT Disk Administrator to partition, assign drive letters, and format the shared logical drives.

Reboot System A

Reboot System A so that Windows NT can recognize the logical drives created when you setup the shared storage. The system boots and loads Windows NT on System A.

CAUTION	You **must** reboot System A to get accurate information about your shared disks **before** running Disk Administrator.

Run Windows NT Disk Administrator

From the Start menu, choose **Programs**, **Administrative Tools**, and then **Disk Administrator**. Disk Administrator loads and scans the disks, and displays a list of the logical disks you identified. An example display follows:

NOTE	Disk Administrator lists disks in order, beginning with local (non-shared) disks followed by the shared disk arrays.
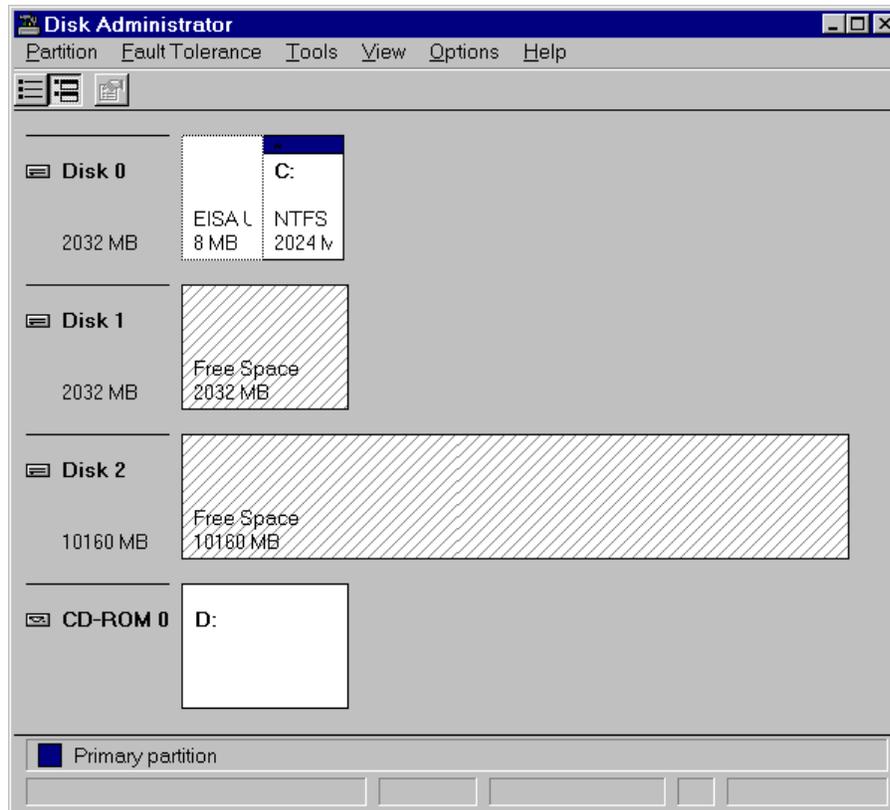
Disk Administrator, Scanned Logical Disks

Create Full Disk Partitions for each Array

1. Click the disk box to select the shared array to be partitioned.
   Disk Administrator highlights the selected disk.

2. From Disk Administrator's **Partition** menu, choose **Create**.
   A dialog appears indicating the maximum size of a single partition.

NOTE	Don't be misled by the displayed disk capacity for your arrays. When Disk Administrator calculates disk capacity, it disregards redundancy storage used by the selected RAID level. The displayed and usable storage capacity for the array is, therefore, less than the total capacity of all drives in the array. For example, the displayed and usable array capacity for a RAID 5 array would be $C(N-1)$, where N is the number of drives and C is the capacity of one drive. Likewise, for RAID 1 the capacity would be one-half the capacity of the two drives.

3. Click **OK** to include the full disk in the partition (the default).
   In the following example, Disk 1 has been partitioned and Disk Administrator assigned a temporary drive letter to the disk array.
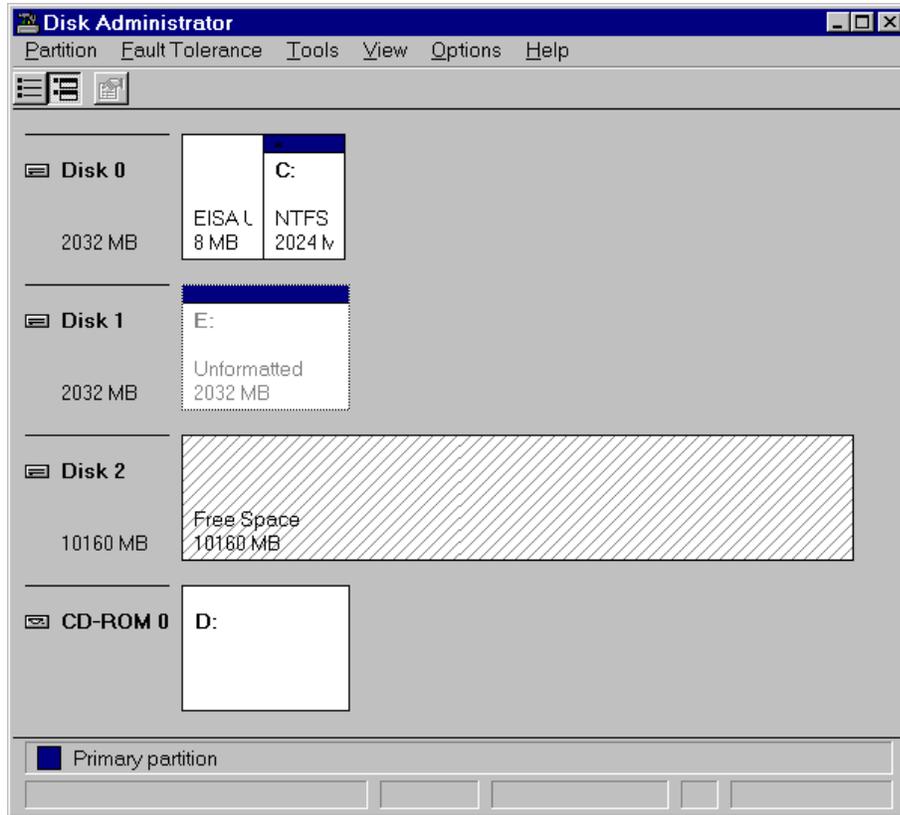
Disk Administrator, Partitioned Disk Array

NOTE	Do not partition a disk into separate drives. Microsoft Cluster Server Software will only manage one partition per disk.

4. Repeat steps 1 through 3 to create a partition for each disk array to be shared by the cluster.

5. From Disk Administrator's **Partition** menu, choose **Commit Changes Now**, then choose **Yes** to save changes and **OK** when prompted.

NOTE	In the following example, Disk 2 has been partitioned and Disk Administrator assigned the next sequential letter to the disk array.
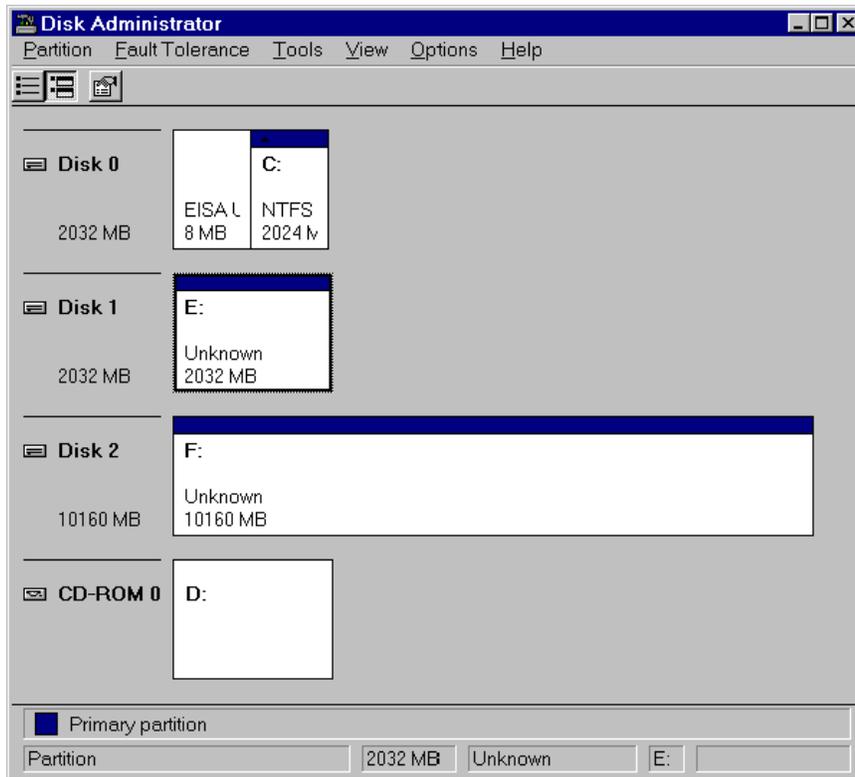
Disk Administrator, All Disk Arrays Partitioned and Committed

Assign Drive Letters

Disk Administrator has assigned sequential and temporary drive letters to the disk arrays you partitioned. You must assign a permanent (static) drive letter to each drive you want to make available to both Systems A and B.

NOTE	When partitioning logical drives with Windows NT the logical drive letters are sequentially assigned in a predefined sequence. These drive letters are temporary assignments that can change according to the drives installed in your system. For clustered systems it is critical that the drive letters for the shared storage drives be fixed. Therefore, make sure that you assign permanent drive letters to the shared logical drives.

1. Select one of the disks you just partitioned.
   Disk Administrator highlights the selected disk.

2. From the Disk Administrator's **Tools** menu, choose **Assign Drive Letter**.
   Disk Administrator displays the **Assign Drive Letter** dialog.

3. In the dialog, select a drive letter, and click **OK**.
   To avoid confusion later, HP recommends that you choose sequential drive letters. The example in this guide uses drive letters X and Y.

Disk Administrator, Assigning Drive Letters

4. Repeat steps 1 through 3 to assign a drive letter for each array to be shared in the cluster.

Format Logical Drives

1. Click a disk box to select one of the arrays that you just partitioned and assigned a drive letter.
   Disk Administrator highlights the selected disk.

2. From the Disk Administrator's **Tools** menu, choose **Format**.
   A dialog appears with a list of formatting options.
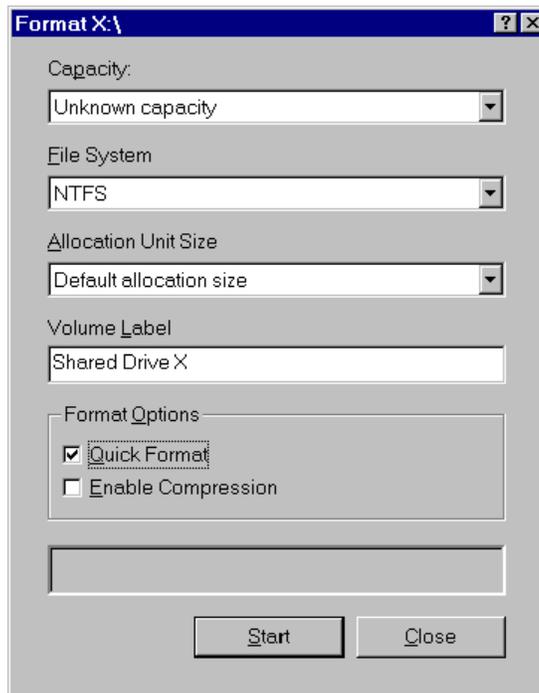
Disk Administrator, Formatting and Assigning Volume labels

3. In the **Format** dialog make sure that **File System** is set for **NTFS**.

4. In the **Volume Label** field type a label (name) for the drive.
   Choose a descriptive label such as "Shared Drive X.".

5. Select **Quick Format** in the **Format Options** field, and then **Start** to begin formatting the logical drive.

NOTE	No action is necessary for the Capacity and Allocation Unit Size fields.

6. Repeat steps 1 through 5 to format each drive to be shared in the cluster.
   The following example depicts both drives formatted with permanent drive letters assigned.
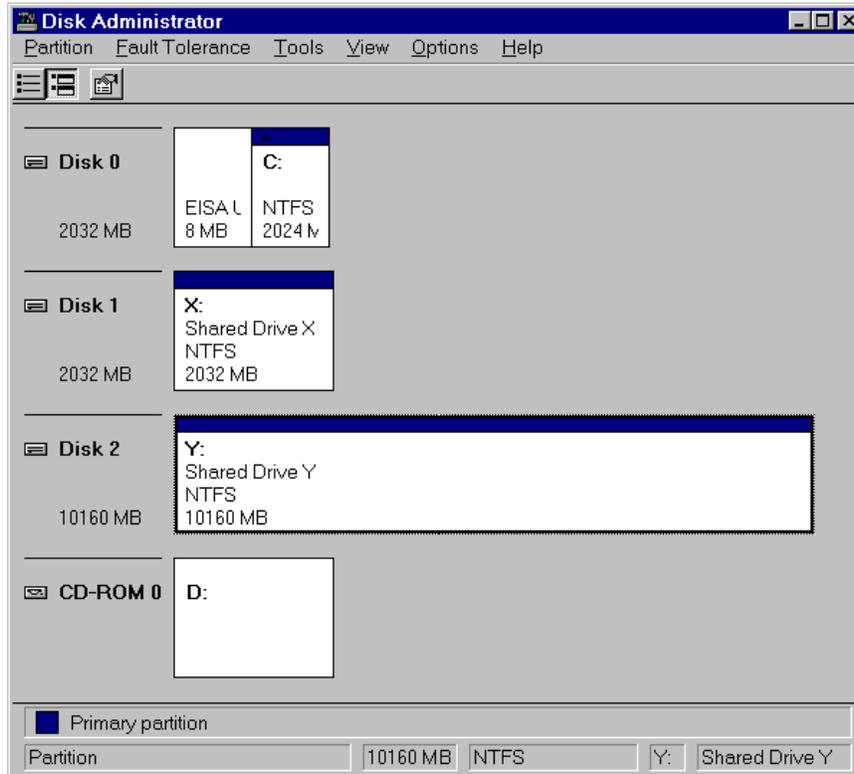
Disk Administrator, Formatting and Assigning Volume labels

7. Exit Disk Administrator.

7 Microsoft Cluster Server Software Setup

During installation of Microsoft Cluster Server Software (MSCS) at System A, you will create a Microsoft Cluster Server. Initially, it is a cluster with only one server (System A). Later, you will join System B to the cluster and thus create a standard two-server (node) cluster. If you need more information about the installation process outlined here, see the *Microsoft Cluster Server Administrators Guide*.

Install MSCS on System A

MSCS installation includes slightly different software setups for System A and System B. Since you just finished configuring arrays on System A, continue Microsoft Cluster Server Setup where you left off with Disk Administrator.

To install MSCS at System A:

1. Insert the *Component CD* of Microsoft Windows NT Server, Enterprise Edition in the CD-ROM drive of System B.

2. Run the Microsoft Cluster Server setup program.
    Setup.exe is located in the following folder on the Component CD: `\mscs\cluster\i386`

3. Choose **Form a new cluster** and click **Next**.
    Setup prompts you to identify the cluster by name.

4. Type a name for the cluster. Make note of the name you type. You will need to provide the identical name during Microsoft Cluster Server software setup of System A.   Click **Next**.
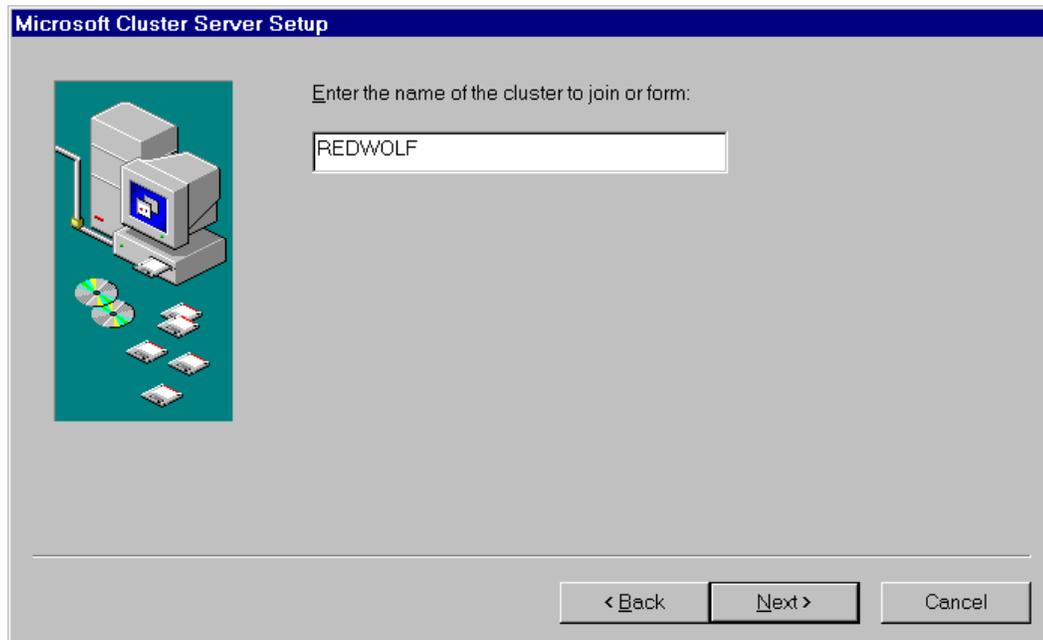
Microsoft Cluster Administrator, Assigning a Cluster Name

5. Setup prompts you for the location to store cluster files. Either accept the default or type a new location and click **Next**.

6. Setup prompts you for the cluster domain account. Provide a user name and password for an appropriate Microsoft Domain account for the cluster. Click **Next**.

NOTE	If you are unsure of the correct MS Domain account, consult the Windows NT documentation supplied with your system.

7. Setup presents a two-column list of **Available unshared** and **Shared cluster disks**. Use the **Add** and **Remove** buttons to place the disks in the desired columns. Click **Next**.

   Keep in mind that disks listed in the left column are reserved for the exclusive use of System B while disks listed in the right column are shared by both systems. Normally you would share all disks listed.
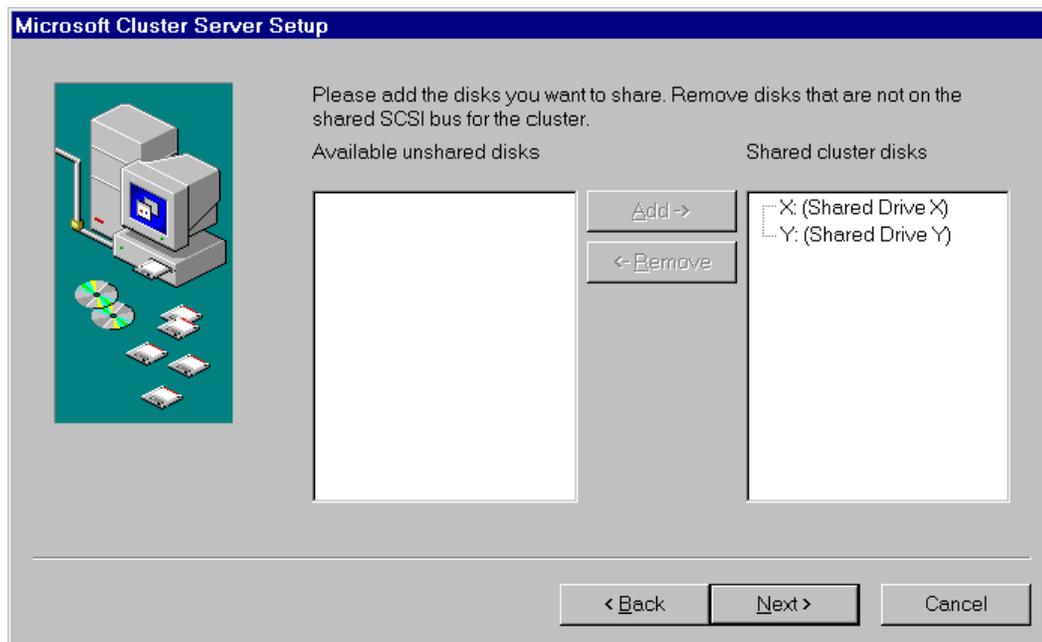
Microsoft Cluster Server Setup, Assigning Shared Disks to the Cluster

8. Setup prompts you to select a disk (quorum disk) on which to store permanent cluster files. Cluster Administrator uses the disk you select to store synchronizing information about Systems A and B. The disk must always be available to the cluster. Select the disk that you will commit to keeping online then click **Next**.

9. Configure your LAN adapters.
   Setup scans the System's LAN adapters so they can be configured for cluster use and presents a dialog for each LAN adapter installed in your HP NetServer.   Setup uses the IP address you specified during NT installation. Type a **Network Name** for the LAN Adapter, and check **Enable for cluster use**.

   HP recommends that you identify the LAN adapter according to use (for example, intra-cluster LAN). When you enable cluster use setup gives you three options:

   • **Use for all communications**
      Choose this option if you are configuring a client LAN adapter, and System A and B reside on the same IP subnet.

- **Use only for internal cluster communications**
  Choose this option if you are configuring an intra-cluster LAN adapter.

- **Use only for client access**
  Choose this option if you are configuring a client LAN adapter and System A and B reside on different IP subnets.

NOTE	In this example, the intra-cluster LAN is shown first with the **Adapter Name** and **IP Address** already filled in. However, your configuration may display the Client LAN first.
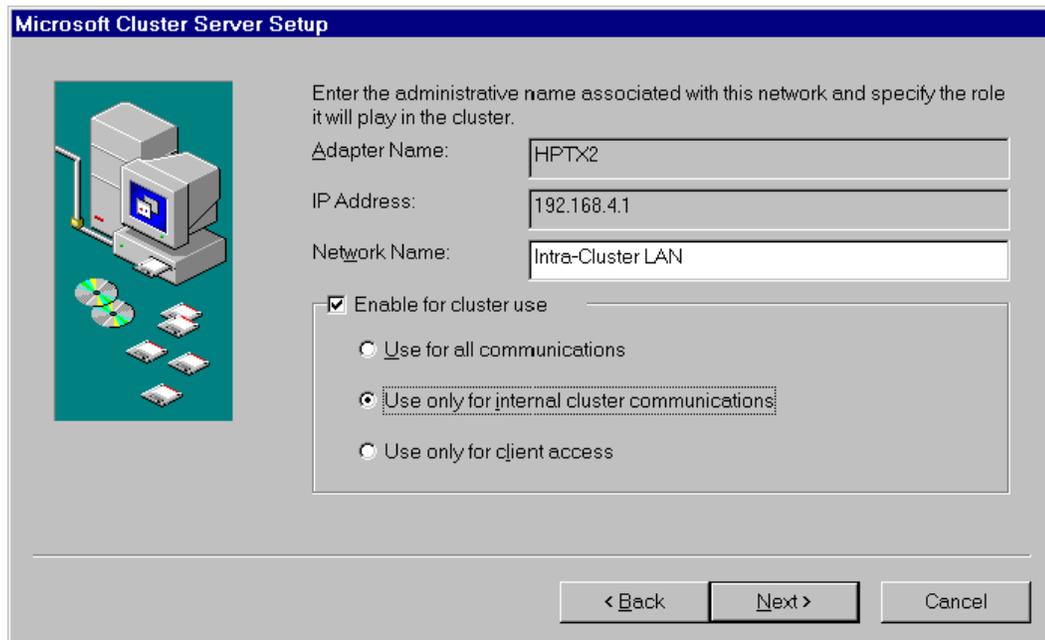
Microsoft Cluster Server Setup, Assigning a Network Name to the intra-cluster LAN

10. Repeat the previous step for each LAN adapter. After you have configured all LAN adapters, click **Next**.

11. Setup lists your LAN adapters and asks you to prioritize them for internal communications between nodes. Move the Intra-cluster LAN to the top of the list so it has the highest priority. See the example dialog below.
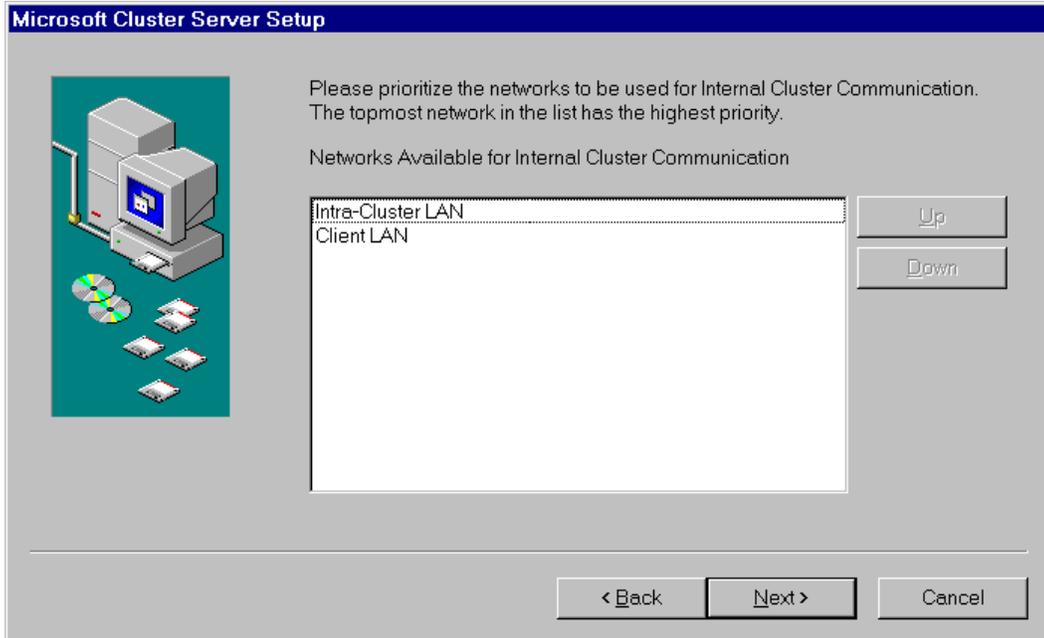
Microsoft Cluster Server Setup, Setting the LAN Priority

12. Follow the on-screen instructions to order the adapters so that the intra-cluster LAN adapter is identified first (at the top of the list). After you have ordered the adapters click **Next**.

NOTE	If you previously defined the client IP addresses of Systems A and B as residing on different subnets, the client LAN will be unable to assume responsibility for intra-cluster communication.

13. Setup prompts you for the Cluster IP address. Type the proper IP address and subnet mask for the CLUSTER, then click **Next**.

NOTE	The previous step requires a unique IP address for the cluster. Do not use either of the IP addresses assigned to System A or System B.

14. Click **Finish** to complete installation of the Microsoft Cluster Server software.
    Setup activates your configuration specifications and starts the cluster service.

15. Microsoft Cluster Server is now fully installed on System A. Reboot System A.

16. To finish installation of the Microsoft Cluster Server, leave System A running, go to the next procedure and install MSCS on System B.

Install MSCS on System B

While you have been configuring System A, System B has been idling at the Restart dialog.

1. Click **Restart** to reboot System B to Windows NT.

2. Insert the *Component CD* of Microsoft Windows NT Server (Enterprise Edition) in the CD-ROM drive of System B.

3. Run the Microsoft Cluster Server setup program.
   Setup.exe is located in the following folder on the Component CD: `\mscs\cluster\i386.`

4. Setup examines your system and displays a dialog that lists a number of install options including **Join an existing cluster**.

5. Choose **Join an existing cluster** and click **Next**.

6. Identify the cluster using the same name you used when you formed the cluster at System B.
   Setup validates your entry by prompting you for the cluster domain account password.

7. Type the password.
   Setup prompts you to complete the installation upon entry of a valid password.

8. Click **Finish**.
   You have now installed and configured all necessary software and hardware components to create a Microsoft Cluster Server.

9. Reboot System B.

Install Service Pack or Hot Fix

After installing MSCS software your must either reinstall SP4 or if you installed SP 3, install the Hot Fix at this time.

Install Hot Fix

Install the Hot Fix (clusfixi.exe):

1. If you have not already downloaded *clusfixi.exe*, see "Software" in part "1 What's Needed."

2. Install the Microsoft hotfix *clusfixi.exe* on System A and System B.

NOTE	When downloading the file, refer to the Microsoft readme file for instructions on installing the hotfix.

8 Cluster Testing

There are two programs for testing the installed cluster. These programs are the Hardware Verification and Labeling Utility and the Cluster Installation Test.

Hardware Verification and Labeling Utility

The Hardware Verification and Labeling Utility scans the system and checks system integrity before you perform system configuration. It helps you simplify the assembly process that must be performed while trying to setup a new product.

With this utility you can:

- Create an asset inventory list

- Check cabling connections

- Label installed hardware

- Health check hardware components

Obtain the Utility

The Hardware Verification and Labeling Utility is included on the *HP NetServer Navigator CD-ROM*. You can run the test directly from the CD, or you can create a bootable floppy disk from HP NetServer Navigator's disk library. The floppy disk is bootable to ensure that it is independent of the customer's network operating system. However, it does not include COMMAND.COM, so it is not usable as a DOS disk.

Run the Utility

CAUTION	The Hardware and Verification Utility is designed to run on a single HP NetServer and not a cluster. Therefore, to prevent corrupting the shared storage in your cluster, power down the cluster node (HP NetServer) not being tested when running this test.

If the system is booted from the *HP NetServer Navigator CD-ROM* you will find that the utility does not appear as a direct menu choice. However, when the Configuration Assistant is run, you will be given the option of first running the Hardware Verification and Labeling Utility. This offer is only made the first time Configuration Assistant is selected after a reboot.

The Hardware Verification and Labeling Utility is supplied with a README.TXT file. This file contains detailed information on the utility and instructions for setting up and running the utility.

Cluster Installation Test

The HP Cluster Installation Test (CIT) should be performed on your installed cluster before placing it online. The CIT performs an operational failover test of the cluster to verify that if a node fails the operating node takes over all functions..

Obtain CIT

If you do not have CIT, see part "1 What's Needed" for instructions to download this program.

Run CIT

Follow the instructions in the CIT program. If additional information is needed refer to CIT on-line help. CIT help is context sensitive and has been expanded to provide detailed instructions for each step of the program.

HP A3661B Model 30/FC
High Availability Disk Array
Supplement
to
HP NetServer
Microsoft Cluster Installation Guide

HEWLETT PACKARD

July 1, 1998

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Safety Considerations

The product and related documentation must be reviewed for familiarization with safety markings and instructions before installation and operation.

Safety Symbols

WARNING   A **WARNING** denotes a hazard that can cause personal injury.

CAUTION   A **CAUTION** denotes a hazard that can damage equipment or result in lost data.

NOTE   A **NOTE** contains information that is useful in accomplishing a task.

Do not proceed beyond a **WARNING** or **CAUTION** notice until you understand the hazardous conditions and have taken appropriate steps.

Grounding

The computer in which this product is installed is a safety class I product and has a protective earthing terminal. There must be an uninterruptible safety earth ground from the main power source to the product's input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, disconnect the power cord until the ground has been restored.

Servicing

Any servicing, adjustment, maintenance, or repair must be performed only by authorized service-trained personnel.

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Contents

Overview

Introduction

An HP NetServer cluster provides a reliable, cabinet-mounted, increased-availability solution for critical applications. The basic cluster consists of two HP NetServer systems coupled to an HP Fibre Channel Arbitrated Loop (FC-AL) hub connected to an HP A3661B Model 30/FC High Availability Disk Array.

The HP Model 30/FC High Availability Disk Array is a high capacity mass storage device that can reside in the same cabinet (also called a rack) as the HP NetServer and an HP FC-AL hub. It uses Fibre Channel technology to ensure fast, reliable access to data.

Both HP NetServers use the HP Model 30/FC High Availability Disk Array as a shared external storage device, using a TACHYON Fibre Channel Adapter Card that comes in the HP45246A Fibre Channel Adpater Kit for NT. A FC I/O adapter card is located in each HP NetServer. Both HP NetServers run Microsoft Windows NT^{TM} Server Enterprise Edition, which includes Microsoft Cluster Server software.

Two HP FC-AL hubs, connected to each other in a cascading arrangement, can be used in a cluster. Also, additional disk arrays can be used for shared external storage.

This guide is a reference to be used during unpacking, setup and installation of the FC I/O adapter, HP Model 30/FC High Availability Disk Array, and HP FC-AL hub as components of your HP NetServer Microsoft Cluster configuration.

The HP Model 30/FC High Availability Disk Array is not customer installable. It must be unpacked and installed only by authorized Hewlett-Packard service representatives. This guide is for the HP service representative who installs the shared external storage units in an HP NetServer Microsoft Cluster.

NOTE	This document is incomplete without the HP NetServer Microsoft Cluster Installation Guide. When prompted by this supplement, turn to the installation guide to get the necessary instructions.

Operating System

The HP Model 30/FC High Availability Disk Array is supported in clustered environments on HP NetServer LXr Pro8 Series systems running the Microsoft Windows NT 4.0 Service Pack 3 or later operating system. It is not supported as a boot device on HP NetServers.

The required Fibre Channel driver for Windows NT is supplied on a diskette that comes with the FC I/O adapter.

1 – What's Needed?

Fibre Channel IDs

During HP Model 30/FC High Availability Disk Array installation, be prepared to supply one Fibre Channel ID for each FC-AL connection between an HP FC-AL hub and an SP on an HP Model 30/FC High Availability Disk Array.

See part 3, step 5, table 2 of this guide for a list of Fibre Channel IDs.

Hardware

Compare the hardware you have with ordering documentation, such as the parts lists created by Order and Rack Assistants. In general, the components for shared external storage components consist of two TACHYON Fibre Channel Adapter Cards, each of which comes in a HP 45246A Fibre Channel Adapter Kit for NT, an HP A3724A short-wave or HP A4839A long-wave FC-AL hub, an HP A3661B Model 30/FC High Availability Disk Array, and the Fibre Channel optic cables used to interconnect these components.

Software

The following driver and diagnostics must be installed from the diskette that comes with the FC I/O adapter:

* FC Driver, version 2.07 or later

* Diagnostic, version 2.07 or later

The following host-resident utilities need to be installed from the CD-ROM that comes with the disk array as part of the A5254A Fibre Channel Mass Storage media kit:

* ArrayGUIde™, version 1.7.0

Tools

Standard installation tools plus:

* Torx™ T-25 driver, supplied in the Rack Installation Toolkit

* Portable Field Service Grounding Kit (3M part number 8505, or the equivalent).

Need More Help?

The following reference materials may be useful when installing the FC I/O adapter, HP FC-AL hub and HP Model 30/FC High Availability Disk Array:

* *Hewlett-Packard TACHYON Fibre Channel Adapter Card Installation Guide (HHBA-5000A)* (part number 5090-4722).

* *Hewlett-Packard Fibre Channel Arbitrated Loop Hub Service and User Manual* (part number A3724-90006).

* *Hewlett-Packard Model 30/FC High Availability Disk Array Service Manual* (part number A3232-90002).

* *Hewlett-Packard Model 30/FC High Availability Disk Array User's Guide and Service Manual Addendum for Microsoft Windows NT 4.0* (part number A3661-90019).

The manuals are enclosed with the hardware components.

◄ **RETURN**   **To part 1 of the HP NetServer Installation Guide.**

2 – HP NetServer Hardware Setup

Install the FC I/O Adapter

1. Install the FC I/O Adapter in the PCI Slot

Install the FC I/O adapter in an appropriate PCI slot as specified in the Configuration Guide for the HP NetServer. Installation steps are shown for both vertical and horizontal installations. Install a FC I/O adapter in each HP NetServer in the cluster.

a. Make sure the HP NetServer is powered down.

b. Remove the chassis cover.

c. Locate the correct PCI expansion slot in the system.

d. Remove the expansion slot cover. Save the slot cover screw.

e. Insert the FC I/O adapter into the slot. Push the adapter into the slot until it clicks into place (see figure 1).
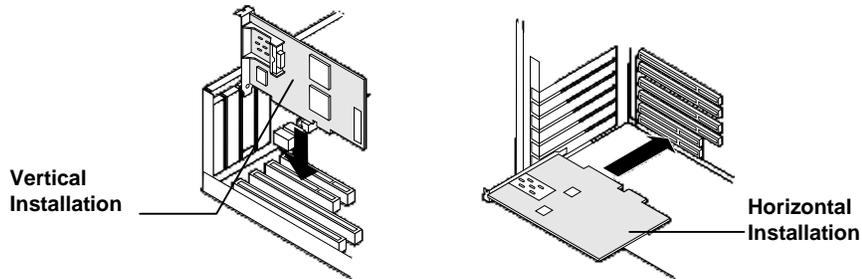
Figure 1. Installing the FC I/O adapter

f. Replace the slot cover screw.

2. Install the GBIC

a. Locate the short-wave GBIC (Gigabit Interface Converter) included in the FC I/O adapter kit.

b. Install the GBIC into the receptacle on the FC I/O adapter (see figure 2).

NOTE	The GBIC can only be installed one way, because the GBIC and guide rails inside the FC I/O adapter receptacle are keyed.

Installing the GBIC _____
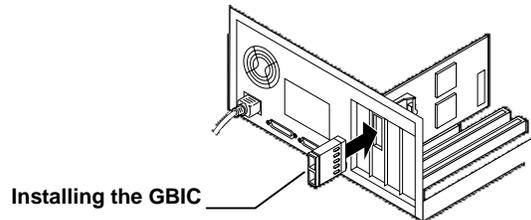
Figure 2. GBIC Module

Do not attach Fibre Channel cables to the FC I/O adapter at this time. Also, do not reboot the HP NetServers at this time.

RETURN **To part 2 of the HP NetServer Installation Guide.**

3 – Shared Storage Hardware Setup

Install the HP FC-AL Hub

1. Unpack the HP FC-AL Hub

    a.   Unpack and inspect the HP FC-AL hub for any damage that may have occurred during shipment.

    b.   Save the boxes and packing materials in case there is damage or anything needs to be reshipped at a future date.

    c.   Make sure all items shown in figure 3 are present. Contact your sales representative if items are missing.

FC-AL Hub Service
and User Manual

Power cord

FC-AL hub

Nylon retainer

FC port covers
in each port

FC-AL short-wave loopback
cable

NOTE: The long-wave hub
includes an additional loopback
cable for the long-wave port

Mounting ear
bracket

Rubber feet
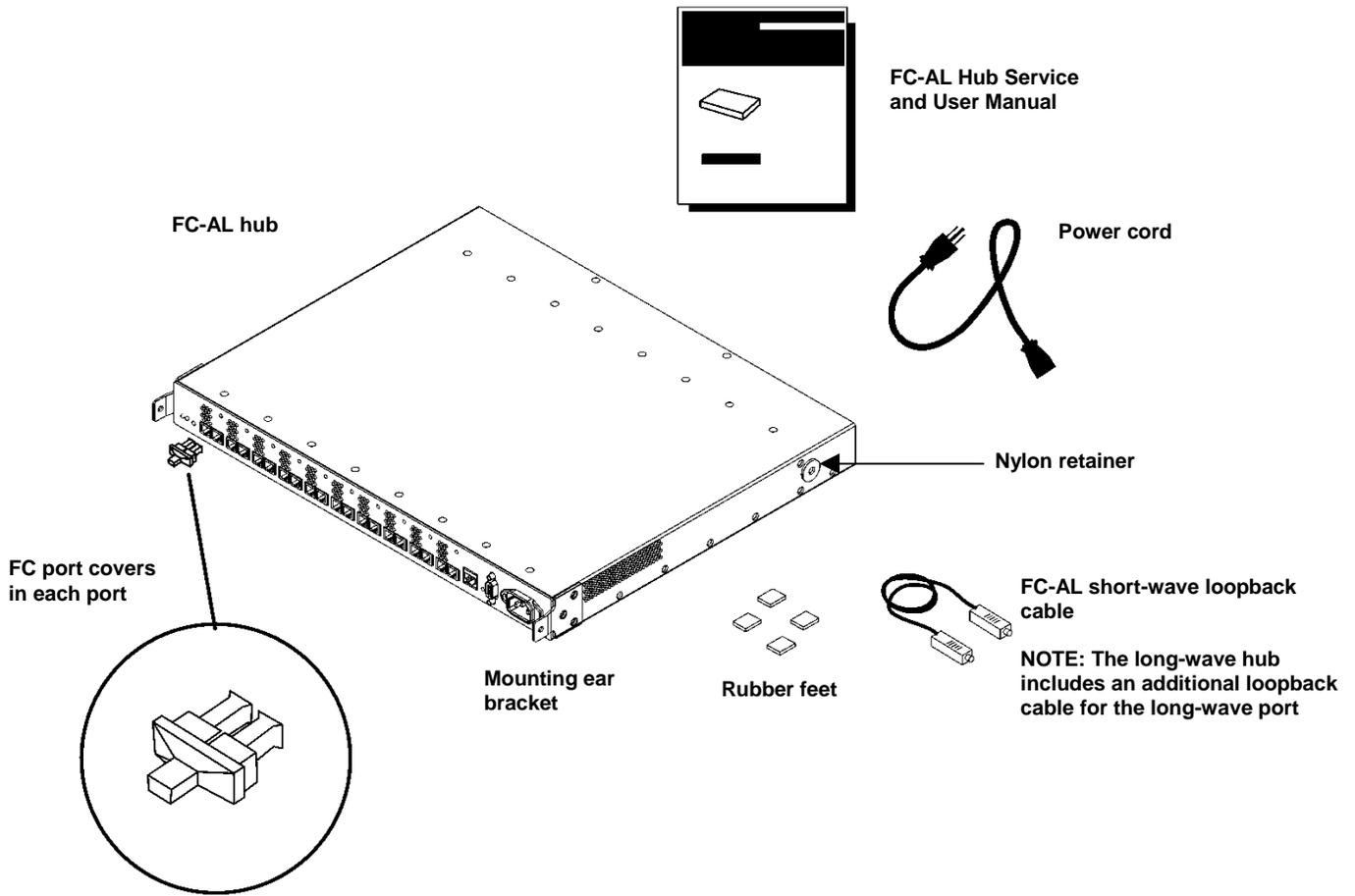
Figure 3. HP FC-AL hub product contents

The front panel of the short-wave hub (HP A3724A) appears as follows:
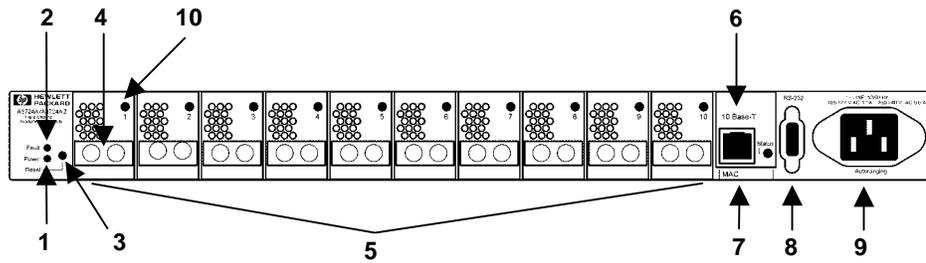
1. Power LED
2. Fault LED
3. Reset button
4. Fibre Channel connector (Port 1 indicated)
5. FC-AL short-wave ports and port LEDs

6. 10Base-T Port (reserved for future use)
7. MAC address (reserved for future use)
8. RS-232 port
9. AC power connector
10. Port LED (Port 1 indicated)

Figure 4. HP FC-AL short-wave hub

The front panel of the long-wave hub (HP A4839A) appears as follows:
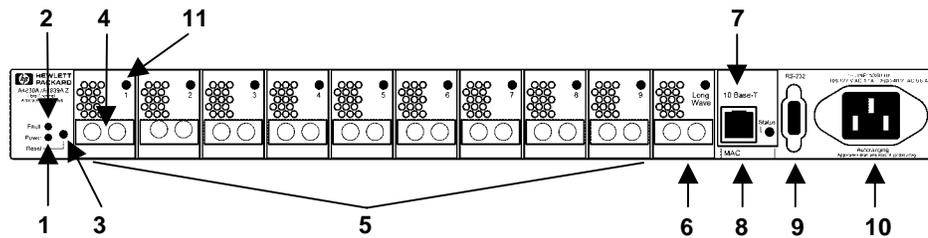
1. Power LED
2. Fault LED
3. Reset button
4. Fibre Channel connector (Port 1 indicated)
5. FC-AL short-wave ports and port LEDs
6. FC-AL long-wave port and port LED

7. 10Base-T Port (reserved for future use)
8. MAC address (reserved for future use)
9. RS-232 port
10. AC power connector
11. Port LED (Port 1 indicated)

Figure 5. HP FC-AL long-wave hub

9

2. Verify HP FC-AL Hub Operation

Test the HP FC-AL hub and verify that it operates before mounting it in the cabinet (also called a rack).

a. Perform a self-test by connecting the short-wave loopback cable to a short-wave hub port, plugging the power cord into the HP FC-AL hub, and then plugging the power cord into a power receptacle. The short-wave loopback cable includes "50/125" as part of the identification information printed on the cable.The HP FC-AL hub does not have a power switch.

If using an A4839A long-wave hub, also self-test the long-wave port with the long-wave loopback cable (A4839-63001). The long-wave loopback cable includes "9/125" as part of the identification information printed on the cable.

NOTE	The HP FC-AL hub's power supply automatically adjusts to a range of 100 VAC ±10% and 240 VAC ±10%.
	Interruptions to the HP FC-AL hub's AC power source initiate a self-test. Make sure the power source circuits are properly grounded before using the supplied power cord to connect the HP FC-AL hub to the circuit.

b. The HP FC-AL hub runs the self-test each time the power cord is plugged in or the Reset button is pressed if a loopback cable or a device is connected.

c. The HP FC-AL hub finishes the self-test in less than 15 seconds.

   • If the Fault LED (amber) stays on after self-test, the HP FC-AL hub failed. Contact your sales representative for assistance.

   • If the Power LED does not light, contact your sales representative.

d. Verify the operation of individual ports by inserting the loopback cable into each port and observing that the port status LED lights up.

e. Unplug the HP FC-AL hub and continue with the installation procedure.

3. Mount the HP FC-AL Hub into the Cabinet

The HP FC-AL hub mounts into the HP E3662A or E3662B 2.0m high, 19-inch wide, 220VAC, EIA cabinet (also called a rack). The following procedure describes mounting an HP FC-AL hub with its front panel facing the rear of the cabinet. The front of the HP FC-AL hub contains the 10 Fibre Channel connectors.

a. Record the serial number, located on the bottom of the HP FC-AL hub, before installing the HP FC-AL hub into the cabinet.

b. Power down the cabinet and unplug it from the power source. Refer to the cabinet documentation for more information. Make sure the cabinet is adequately secured and has enough space (1 EIA) for the HP FC-AL hub. Remove filler panels as needed from the front of the cabinet and open the rear door.

c. Slide a sheet metal nut onto the outer column in the back of the cabinet, so the hole in the nut is aligned with the hole at the selected EIA location on the column.

d. Insert one end of the left rail in the adjoining slot, so the hole in the rail lines up with the holes in the nut and column (see figure 6).

e. Attach the other end of the rail to the inner column on the front of the cabinet using the same procedure and a second sheet metal nut.

NOTE	Do NOT attach screws at this time.
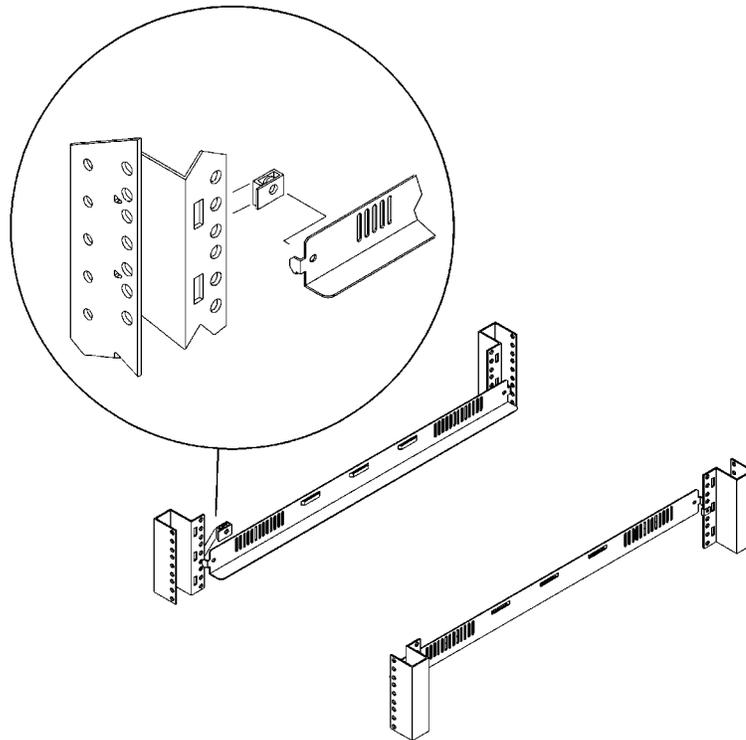
Figure 6. Installing rails for the FC-AL hub into the cabinet

f. Repeat steps c, d, and e to install the right rail.

g. Set the HP FC-AL hub on the cabinet. Align the hole in each mounting ear bracket with the holes in the assembled rail, nut, and column, and insert a 10-32 x .625 machine screw. Securely tighten the screws (see figure 7).
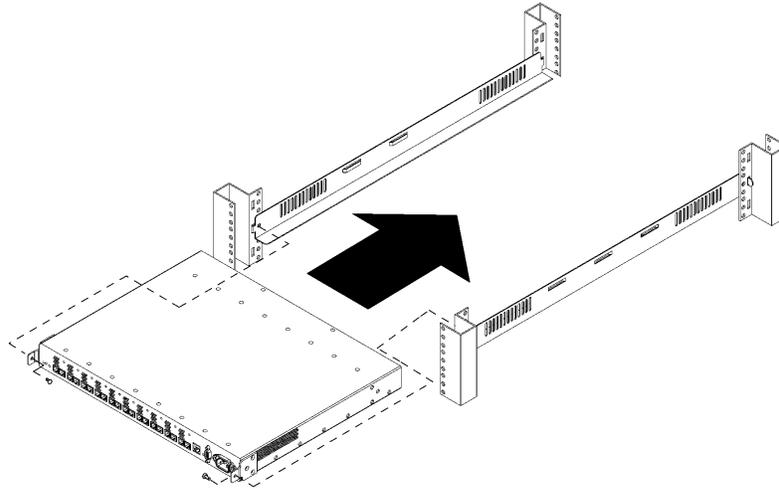
Figure 7. Installing the HP FC-AL hub into the cabinet

h. The plenum shroud is a back cover that slides onto the HP FC-AL hub. Set the plenum shroud on the front side of the cabinet. Align the holes in the brackets with the holes in the assembled rails and outer posts.

i. Secure the brackets to the posts with 10-32 x .625 machine screws (see figure 8).
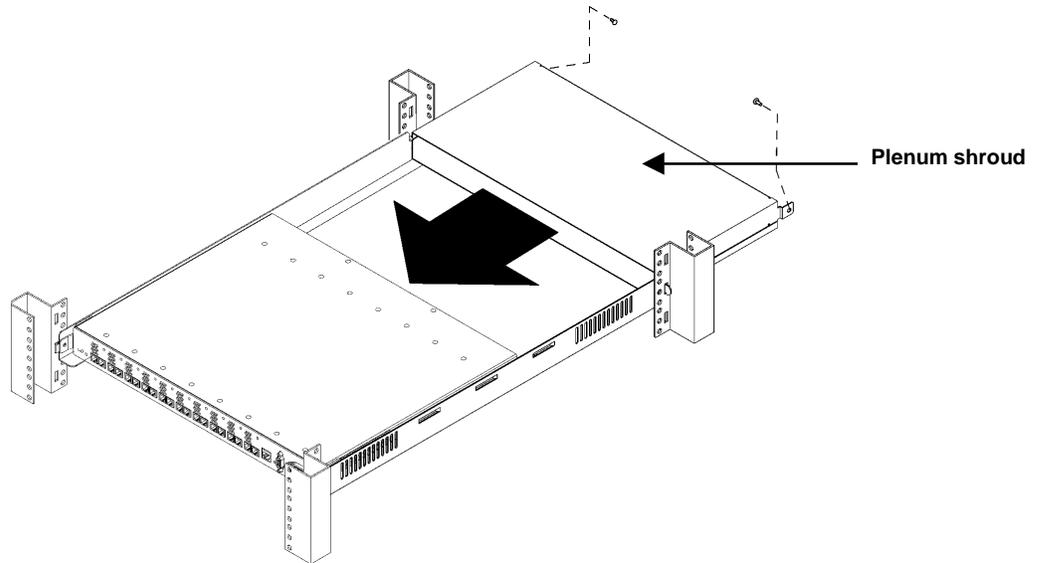
Figure 8. Installing the plenum shroud

j. Reinstall filler panels over the plenum shroud.
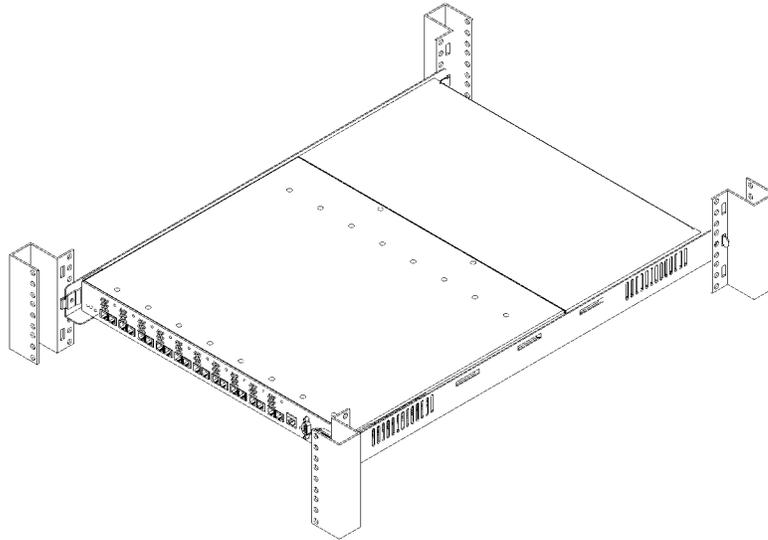
Figure 9. HP FC-AL hub correctly installed in a cabinet

If cascading HP FC-AL hubs are being used, install the second HP FC-AL hub, following the same steps used in installing the first HP FC-AL hub.

Do not attach Fibre Channel cables or power cords to the HP FC-AL hub at this time. Also, do not power up the cabinet at this time.

Install the HP Model 30/FC High Availability Disk Array

1. Check Power Requirements

Refer to the disk array DC power requirements in the Reference chapter of the *Hewlett-Packard Model 30/FC High Availability Disk Array Service Manual* (part number A3661-90002) to make sure the installation site meets these requirements.

The HP Model 30/FC High Availability Disk Array uses 200VAC to 240VAC nominal; 110VAC is not supported. One power distribution unit (PDU) in the cabinet can provide sufficient power for one, two, or three disk arrays. The disk array and HP FC-AL hub are connected to the PDU; the PDU is connected to an UPS.

Make sure the UPS is capable of supplying an amount of power equal to the sum of the VA units required to power all the systems and peripherals installed in the cabinet.

Consider the type of PDU that is required. PDUs have power inlets and outlets that impinge on clearances necessary to fully open the disk array's fan pack door. Table 1 specifies the required PDUs for various hardware configurations installed in one cabinet.

Table 1 – PDU Requirements

PDU part number	PDU product number	Description	Typical application	Racking restrictions
E5929-63001	E5929A	- Universal PDU - Ten C-13 and one C-19 outlets - One C-20 inlet for detachable cords	C-19 outlet is for SPUs requiring a 20-amp connector. C-20 inlet facilitates a universal set of detachable power cords. Typically, for external UPS applications	Must be racked on rails at or above 4 EIAs to clear the C-19 outlet. If the C-19 outlet is not used, must be racked on rails at or above 1 EIA to clear the C-20 inlet.
	E5931A	- N. America 220 V PDU - Ten C-13 outlets - Attached 3 m power cord with L6-30P plug	Attached to a 3.0 or 5.5 kva N. American UPS	None
	E5932A	- Europe 220 PDU - Ten C-13 outlets - Attached 3 m power cord without plug	Attached to a 3.0 or 5.5 kva European UPS	None
E4456-63001	E4456B	- N. America 220 V PDU - Ten C-13 and one C-19 outlets - Attached power cord with L6-20P plug	C-19 outlet is for SPUs requiring a 20-amp connector. Power cord typical for N. America wall outlet connection.	Must be racked on rails at or above 4 EIAs to clear the C-19 outlet. If the C-19 outlet is not used, must be racked on the bottom of the rack without rails.
E4457-63001	E4457B	- Europe 220 V PDU - Ten C-13 and one C-19 outlets - Attached power cord without a plug	C-19 outlet is for SPUs requiring a 20-amp connector. Power cord has stripped ends for attaching localized plug.	Must be racked on rails at or above 4 EIAs to clear the C-19 outlet. If the C-19 outlet is not used, can be racked on the bottom of the rack without rails.
C2786-63006	E4456A	- N. America 220 V PDU - Ten C-13 outlets - Attached power cord with L6-20P plug		None
C2786-63007	E4457A	- Europe 220 V PDU - Ten C-13 outlets - Attached power cord without plug	Power cord has stripped ends for attaching localized plug.	None

The HP Model 30/FC High Availability Disk Array is rated to draw approximately 5amps at 230VAC steady state current for normal operation. However, when powered on, the disk array draws a heavy in-rush (surge) current (up to 115 amps for 10 to 12 ms) that could trip standard industrial circuit breakers.

Hewlett-Packard strongly recommends installing magnetic-type circuit breakers capable of handling large in-rush currents for short durations (10 to 12 milliseconds), but rated adequately for steady state currents.

For European installations, Hewlett-Packard strongly recommends installing 20A circuit breakers, Type C or Type D per IEC 898, or Type K per IEC 947-2.

All electrical wiring to the service point (plug) for the disk array should be sized adequately to carry the in-rush and steady state currents shown above.

2. Unpack the HP Model 30/FC High Availability Disk Array

The HP Model 30/FC High Availability Disk Array must be installed into an HP E3662A or E3662B 2.0m high, 19-inch wide, 220VAC, EIA cabinet (also called a rack) at the installation site.

The disk modules for the disk array are packaged in boxes separate from the disk array chassis. Each box containing disk modules has a label imprinted with the chassis number of the disk array into which the disk modules should be installed. The disk modules are shipped with the disk array and banded to the pallet. Boxes of cables and accessories are shipped separately.

a. Move the disk array, disk modules, and boxes containing the cables and accessories to the cabinet where the equipment will be installed.

b. Cut the plastic bands around the shipping carton and pallet.

WARNING	Wear protective glasses while cutting the plastic strapping bands. They are under tension; when cut, they can spring back and cause serious eye injury.

c. Remove the shipping carton(s) containing the disk modules from the top of the disk array's shipping carton.

d. Open the disk array's shipping carton by cutting the tape over the seams.

e. Lift the shipping carton off the disk array.

f. Remove all foam strips from around the disk array.

| **WARNING**	Do not lift the disk array chassis by the fan pack handle at the back of the disk array. Doing so can damage the disk array.
	The disk array is very heavy. Use extreme care when moving or lifting it. At least two persons are needed to lift and safely install a disk array into a cabinet.

Caution >75 lbs >34 kg

g. Remove the cardboard braces from the ends of the disk array. Keeping your hands under the bottom of the unit, lift the disk array off the pallet. Place the unit on a suitably sturdy, anti-static work surface.

h. Remove the protective covering from the disk array.

i. Remove the disk array's front bezel by grasping its sides and pulling straight out. If the bezel is difficult to remove, use a small standard screwdriver to carefully loosen the bezel at its four outside corners.

To remove front bezel,
grasp the sides of the panel
and pull straight out.
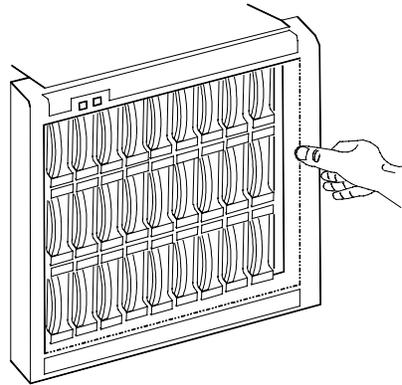
To install front bezel,
press panel onto ballstuds.

Ballstud
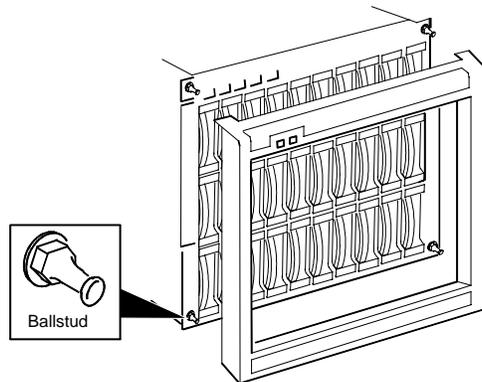
Figure 10. Removing the front bezel

3. Prepare the Cabinet

The HP Model 30/FC High Availability Disk Array requires 11 EIA units of space in the cabinet.

The hardware mounting kit (part number A3661-60006), which is shipped with the disk array, consists of:

– 2 rails (part number A3661-00002)
– 20 retaining screws (part number 2680-0278)
– 16 clip nuts (part number 0590-0804)
– 1 custom trim panel (part number A3661-00001)

a. Make sure the cabinet is powered down. Refer to the cabinet documentation for more information.

b. Remove any trim and open the doors of the cabinet. Refer to the cabinet documentation for more information.

c. Attach the mounting rails to the cabinet as shown (see figure 11).

- Determine the location in the cabinet where the disk array is to be mounted. The disk array should be mounted in the lowest position available in the cabinet.

- Install two clip nuts (A in figure 11) over the two holes in the front and back cabinet columns at the height where the left rail is to be mounted.

- Mount the left rail by inserting the tabs at the front and rear of the cabinet (B in figure 9).

- Install the two screws (one on the front column and one on the rear column) to anchor the rail in the cabinet (C in figure 11).

- Install the right rail in the same manner.
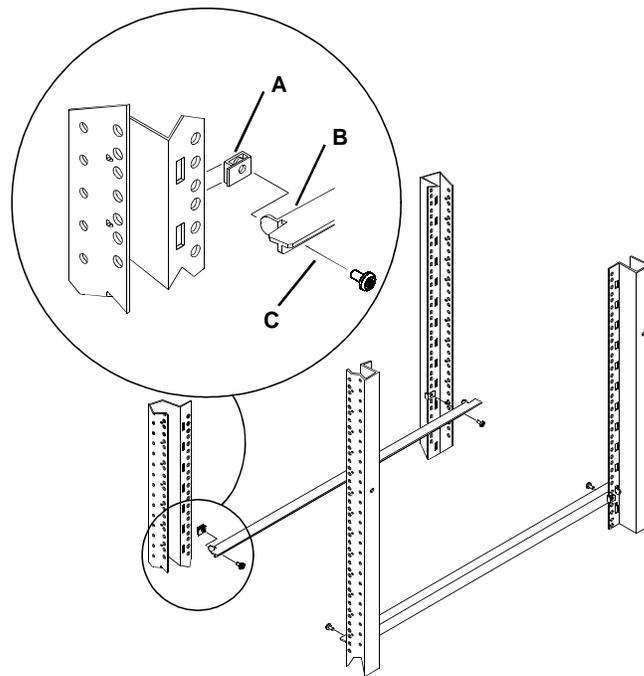
Figure 11. Installing mounting rails for the disk array into the cabinet

d. Install the clip nuts.

- Count up 14, 20, and 26 holes from the hole used to install the rail and slide clip nuts over these holes for the front retaining screws. Perform these steps for both sides of the front of the cabinet, installing a total of six clip nuts.

- Count up five and six holes from the holes used to install the rear of the rails and install the clip nuts for the rear retaining screws on both sides of the cabinet.

4. Install the HP Model 30/FC High Availability Disk Array in the Cabinet

a. Remove the fan pack from the back of the disk array.

- Grasp the fan pack handle.

- Press the lock/unlock button and hold it down.

- Carefully swing the fan pack down.

- Press the release latches in the direction shown.

- Pull the fan pack away from the chassis.

CAUTION	Do not lift a fan pack by its handle as doing so can damage the fan pack.

Replace light
(amber)

Lock/unlock button

Back of
storage system

Holding module at
slight angle, slide it
away from chassis.
Be careful not to pull
power cord out of
socket.

ac power
cord

ac power
cord

release
latches
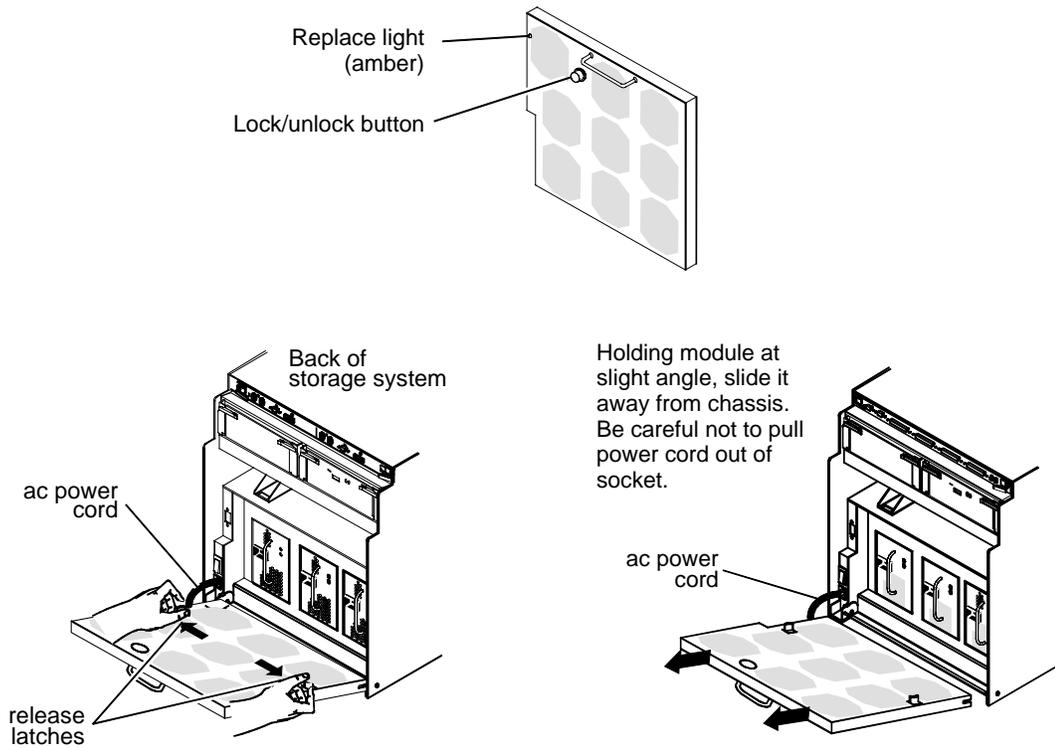
Figure 12. Removing the fan pack

b. Remove the battery backup unit (BBU) from the back of the disk array.

  – Locate the BBU. It is above the power supply units.

  – Grasp the BBU by inserting your thumbs in the holes and your forefingers into the latches.

  – Slide the latches inward and hold.

  – Pull the BBU out of the chassis.

Back of storage system
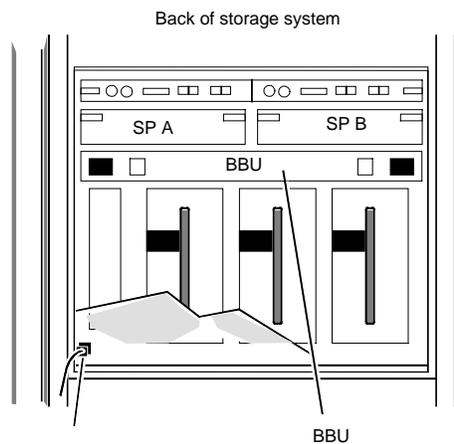
Figure 13. Location of the BBU

| **CAUTION** | Use caution when removing the BBU. It is very heavy. |
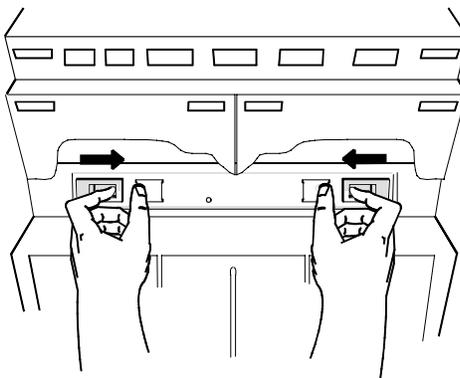
Figure 14. Removing the BBU

c. Remove the power supply units from the back of the disk array

  – Grasp a power supply unit by its handle.

  – Squeeze the latch toward the handle.

  – Pull the power supply unit out of the chassis.

  – Repeat for the other power supply units.
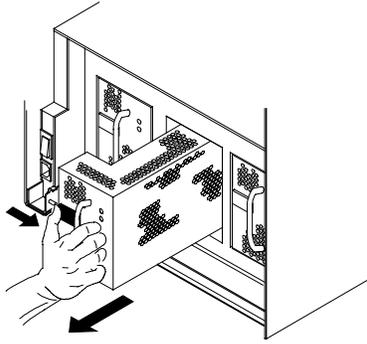
Figure 15. Removing a power supply unit

d. Mount the disk array chassis into the cabinet.

WARNING	The disk array is very heavy. Use extreme care when moving or lifting it. At least two persons are needed to lift and safely install a disk array into a cabinet.

Caution
>75 lbs
>34 kg

CAUTION	The disk array must be installed so that opening the fan pack door does not interfere with any plug on the cabinet PDU, any cables, any PDUs, or any other devices.

– Slide the chassis onto the rails and into the cabinet.

– Secure the front of the chassis to the cabinet with six retaining screws.

– Secure the rear of the chassis to the cabinet with four retaining screws.
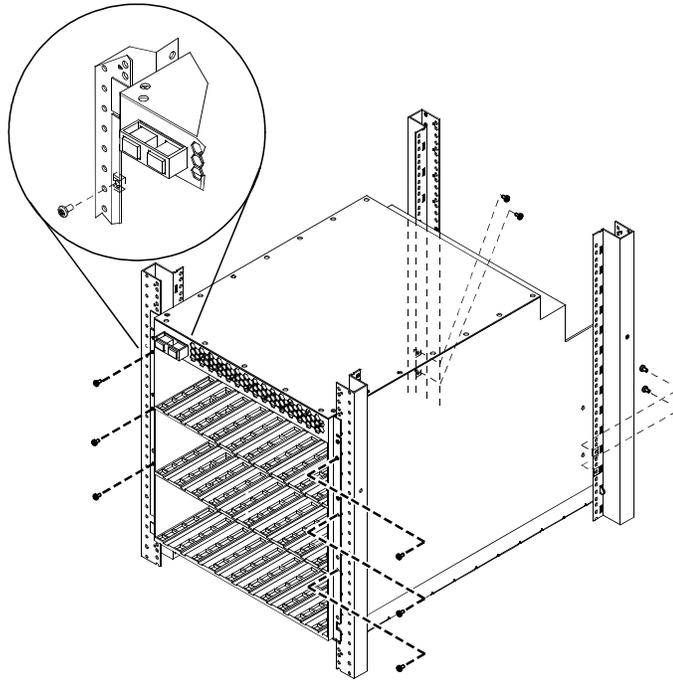
Figure 16. Mounting the disk array into the cabinet

e. Unpack and install the disk modules.

CAUTION	Handle disk modules very carefully as they can be damaged easily by shock and vibration.
	Strap the ESD wrist strap to your wrist and ground it to the disk array chassis (or suitable ground). Place the disk module on an ESD conductive sheet when it is removed from its carton. Use ESD kit P/N 5182-4119 (supplied with each disk array).

Make sure each disk module's label, which shows its slot ID (A0, for example), is present.

The disk modules must be installed in the slot that matches the slot ID on the label. For the slot ID numbers, refer to the disk array chassis illustrations in chapter 1 of the *Hewlett-Packard Model 30/FC High Availability Disk Array Service Manual* (A3661-90002). Make sure that all the disk slots contain disk modules or filler panels to ensure proper cooling.

–   Observe anti-static precautions.

–   Locate the slot where the disk module is to be installed (see figure 17).

–   Write the slot number the disk is being installed into on the label affixed to the disk module; for example, A1.

–   Install the disk module gently but firmly by sliding it into the slot. Rough handling can damage the disk module. Seat the disk module slowly into the connector.
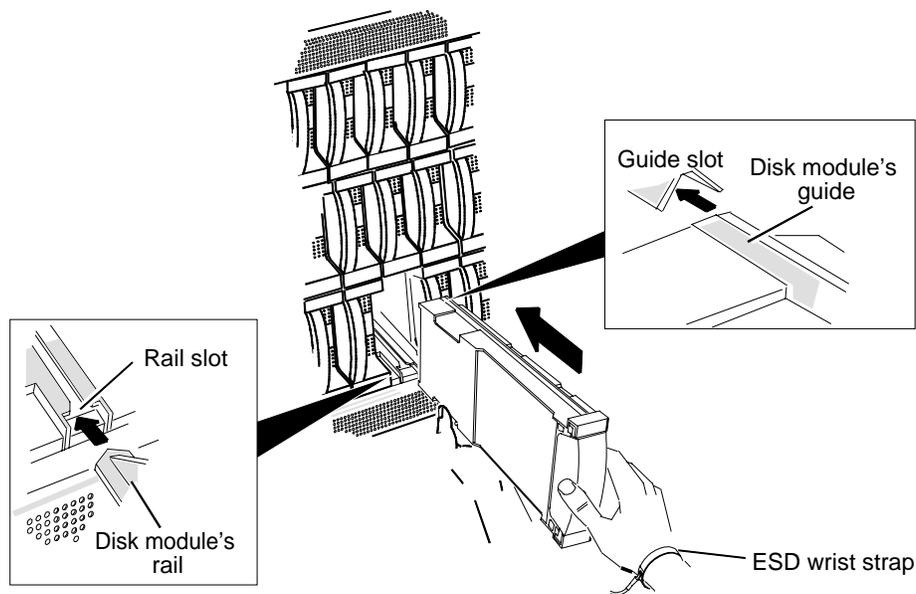
Figure 17. Installing a disk module

22

f. Replace the power supply units.

  – Locate the slot where the power supply unit is to be installed.

  – Slide each power supply unit into its slot while squeezing the latch until it engages the connector.

  – Press firmly until the power supply unit seats fully into the chassis.
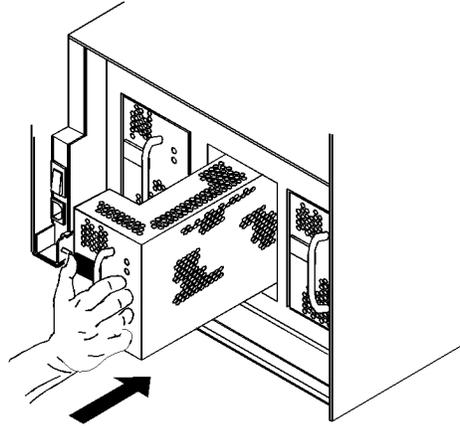
**Figure 18. Replacing a power supply unit**

g. Replace the BBU.

  – Locate the slot where the BBU is to be installed.

  – Slide the BBU into the slot until it engages the backplane connector.

  – Press firmly until the BBU seats fully into the chassis and the latches lock.

h. Replace the fan pack.

CAUTION	The disk array must be installed so that opening the fan pack door does not interfere with any plug on the cabinet PDU, any cables, any PDUs, or any other devices.

  – Push the fan pack hinge channels onto the chassis hinge pins.

  – Be sure latches seat over hinge pins.

  – Close the fan pack by carefully swinging it up.

  – Firmly press the fan pack against the disk array chassis until the lock/unlock button engages.

Holding module at slight angle, slide it onto hinge pins.

ac power cord
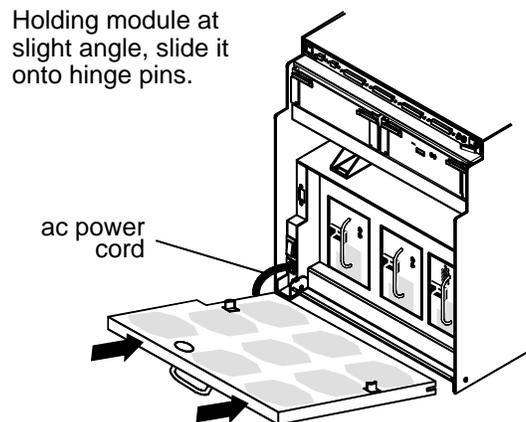
Figure 19. Replacing the fan pack

i. Reinstall trim.

   – Install the 1/2 U filler panel (part number A3661-00003) to the bottom of the disk array's front bezel using four of the screws (part number 2680-0273) from the hardware mounting kit.

   – Reinstall the disk array's front bezel.

   – Reinstall any trim removed from the cabinet and close the cabinet doors. Do not power up the cabinet at this time.

5. Set the Fibre Channel ID for the SP in the Disk Array

Each HP Model 30/FC High Availability Disk Array can have two SPs (storage processor controllers), which are located in the back of the disk array. In a basic cluster consisting of two HP NetServers, one HP FC-AL hub and one disk array, the HP FC-AL hub will be connected to SP A of the disk array. SP A is on the left of the Fibre Channel Interconnect PCA (Printed Circuit Assembly). The SP on the right, if it is present, is SP B.

The back of the disk array has two pairs of Fibre Channel address switches on the Fibre Channel Interconnect printed circuit assembly (PCA) (see figure 20). One pair is used to set the Fibre Channel address for SP A. The other pair sets the Fibre Channel address for SP B. The left switch in each pair has eight values (hexadecimal 0x0 through 0x7); the right switch has 16 values (hexadecimal 0x0 through 0xF).
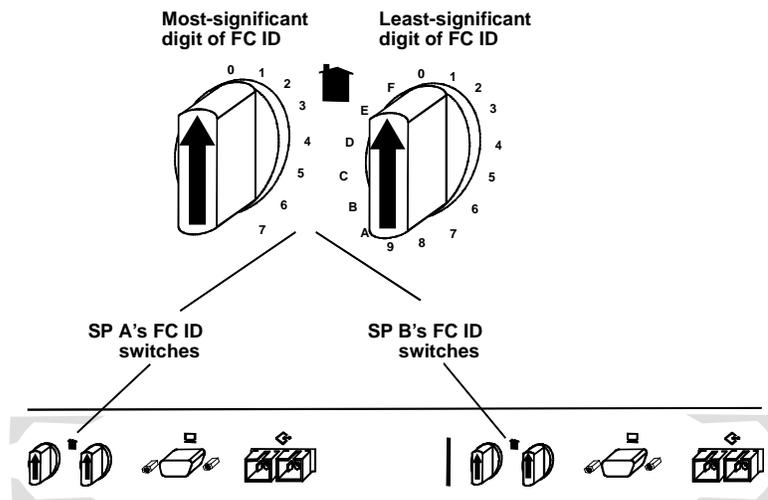

Figure 20. Fibre Channel ID switches

The Fibre Channel address is composed of two digits. The left digit (the high-order digit) is set by the left switch. The right digit (the low-order digit) is set by the right switch.

Occasionally two or more ports in an FC arbitrated loop will arbitrate simultaneously. Priorities are decided according to the loop IDs. The higher the loop ID, the higher the priority.

NOTE	Each SP requires a unique Fibre Channel address number.

Using table 2 as a guide, set the switches for the SP's Fibre Channel address. Each Fibre Channel address should be set to a unique value. For example, if the desired loop ID is 0x09, the left switch is set to 0 and the right switch is set to 9. Valid loop IDs are from 0x00 to 0x7E (126 decimal) inclusive.

CAUTION	Do NOT use FC address 0x7E (126 decimal) because it will cause a system panic.

Table 2 – Fibre Channel Addresses

FC address (Loop ID)		FC address (Loop ID)		FC address (Loop ID)	
(hexadecimal)	(decimal)	(hexadecimal)	(decimal)	(hexadecimal)	(decimal)
00	0	2B	43	55	85
01	1	2C	44	56	86
02	2	2D	45	57	87
03	3	2E	46	58	88
04	4	2F	47	59	89
05	5	30	48	5A	90
06	6	31	49	5B	91
07	7	32	50	5C	92
08	8	33	51	5D	93
09	9	34	52	5E	94
0A	10	35	53	5F	95
0B	11	36	54	60	96
0C	12	37	55	61	97
0D	13	38	56	62	98
0E	14	39	57	63	99
0F	15	3A	58	64	100
10	16	3B	59	65	101
11	17	3C	60	66	102
12	18	3D	61	67	103
13	19	3E	62	68	104
14	20	3F	63	69	105
15	21	40	64	6A	106
16	22	41	65	6B	107
17	23	42	66	6C	108
18	24	43	67	6D	109
19	25	44	68	6E	110
1A	26	45	69	6F	111
1B	27	46	70	70	112
1C	28	47	71	71	113
1D	29	48	72	72	114
1E	30	49	73	73	115
1F	31	4A	74	74	116
20	32	4B	75	75	117
21	33	4C	76	76	118
22	34	4D	77	77	119
23	35	4E	78	78	120
24	36	4F	79	79	121
25	37	50	80	7A	122
26	38	51	81	7B	123
27	39	52	82	7C	124
28	40	53	83	7D	125
29	41	54	84	7E	126
2A	42				

To install additional HP Model 30/FC High Availability Disk Arrays into the same cabinet, first verify that 11 EIA units of space are available in the cabinet, then repeat steps 2 through 5. Be sure to set the Fibre Channel address of each SP in each disk array to a unique number.

Do not attach Fibre Channel cables or power cords at this time. Also, do not power up the cabinet at this time.

◀ RETURN   **To part 3 of the HP NetServer Installation Guide.**

4 – Cluster Cabling and Setup

1. Plan the HP FC-AL Hub Connections

The HP NetServers should be powered down when making the FC-AL connections to the FC I/O adapters. Power down the HP NetServers if they are not already powered down. The HP Model 30/FC High Availability Disk Array and the cabinet should still be powered down at this time.

CAUTION	Incorrect wiring can lead to problems, such as devices left off the loop and inaccessible by the HP NetServer. Follow the guidelines below before starting.

a. Review the hardware address of each FC-AL device to be connected to the HP FC-AL hub, and make sure each ID is unique. Duplicate IDs on the loop can cause problems. In addition, each device has its own factory-assigned unique worldwide name.

b. Verify that the connections between the HP FC-AL hub port and the disk array or the FC I/O adapter in the HP NetServers are of the same wave type and speed. For example, plan to connect a short-wave port on the HP FC-AL hub to a short-wave port on an FC-AL device.

c. Document the planned connections in a cabling map.

2. How to Make an FC-AL Connection

To connect a fiber optic cable to an HP FC-AL hub, find any available, appropriate Fibre Channel port on the HP FC-AL hub, remove the FC port cover, and connect the fibre optic cable. No priority or hierarchy is assigned to the connectors on the HP FC-AL hub.

The cable connector is keyed to avoid incorrect installation. Short wave cables should be used to connect short-wave ports. A long-wave cable should be used to connect the long-wave ports of cascading long-wave hubs.

NOTE	Fiber optic cables and connectors are extremely fragile. Avoid twisting or bending the cable to less than a 3 cm radius.

If using a single short-wave hub, FC-AL connections can be made to any of the 10 short-wave ports of the HP FC-AL hub. That is, the FC I/O adapters and the disk array can be connected to any ports on the HP FC-AL hub.

If using cascading short-wave hubs, connections between HP FC-AL hubs and from the HP FC-AL hub to the FC I/O adapters and the disk array can be made to any of the 10 ports on the HP FC-AL hub.

If using a single long-wave hub, FC I/O adapters and the disk array can be connected to Port 1 through Port 9 (the leftmost nine, short-wave ports). Port 10 (the rightmost, long-wave port) should not be used to connect these devices.

If using cascading long-wave hubs, the two HP FC-AL hubs should be connected to each other using the long-wave Port 10. Port 1 through Port 9, the short-wave ports, can be used to connect FC I/O adapters and the disk array.
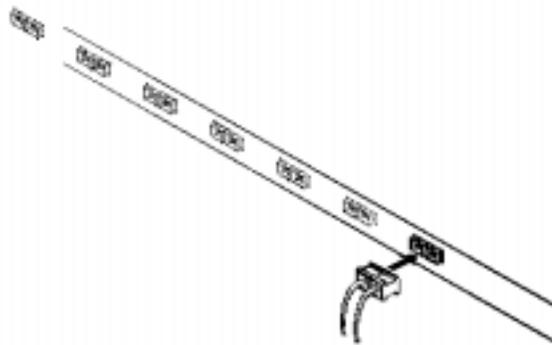

Figure 21. Connecting a fiber optic cable to a Fibre Channel connector

26

NOTE	To protect hub ports, port covers should remain installed in all unused ports.

3. Connect Cascading HP FC-AL Hubs

If using cascading hubs, connect the two HP FC-AL hubs to each other.

- If connecting short-wave hubs, refer to figure 28.

- If connecting long-wave hubs, refer to figure 29.

– When installing long-wave cascading hubs (HP A4839A), make sure the long-wave port (Port 10) is connected only to the long-wave port (Port 10) on the other long-wave hub.

4.   Connect the FC I/O Adapter to the HP FC-AL Hub

a.   Connect the HP FC-AL hub to the FC I/O adapter on each HP NetServer.
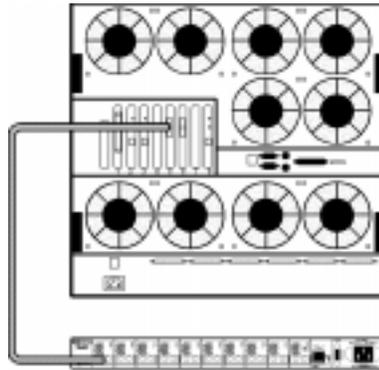
Figure 22. An example of an HP FC-AL hub connected to an HP NetServer LXr Pro8
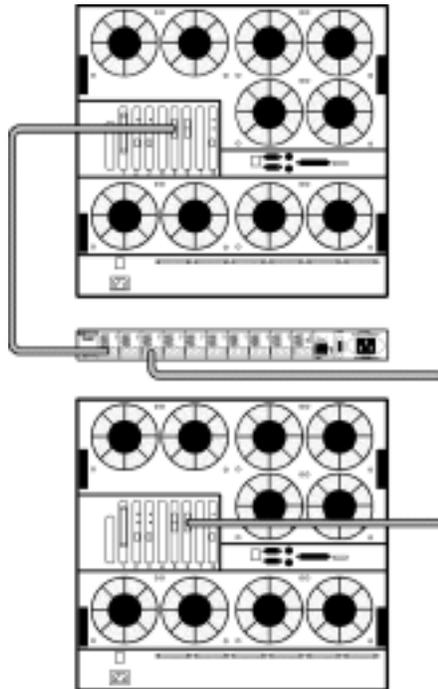
Figure 23. An example of an HP FC-AL hub connected to two HP NetServer LXr Pro8s

27

5. Connect the HP Model 30/FC High Availability Disk Array to the HP FC-AL Hub

The external Fibre Channel connectors link the disk array to an HP FC-AL hub through fiber optic cables. These connectors are located at the back of the disk array, on the Fibre Channel Interconnect (printed circuit assembly). The Fibre Channel connectors are located above the SPs. One Fibre Channel connector is associated with each SP. The HP Model 30/FC High Availability Disk Array can have one or two SPs: SP A and SP B (see figure 24). If connecting the disk array to a single HP FC-AL hub, make the connection to SP A.
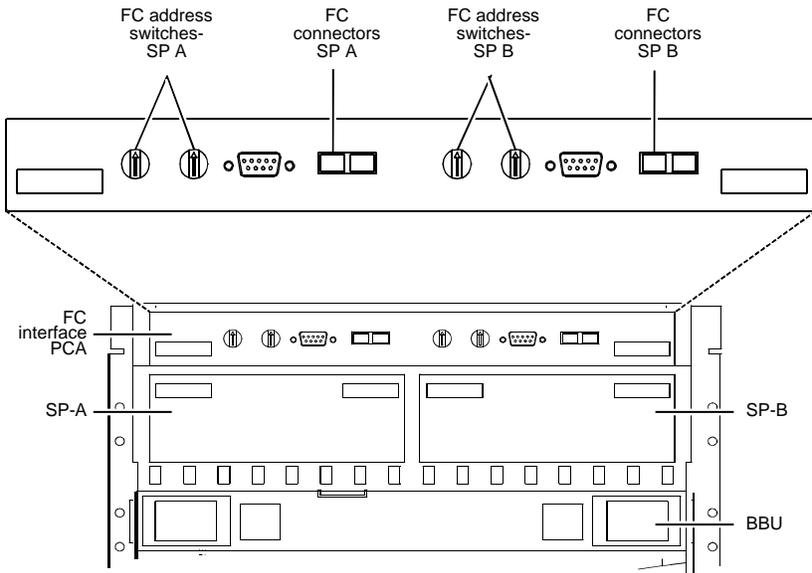
Figure 24. Fibre Channel connector locations
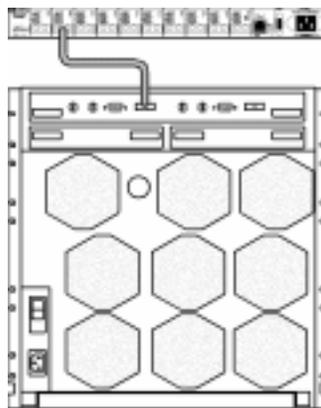
Figure 25. Connecting the HP FC-AL hub to the disk array
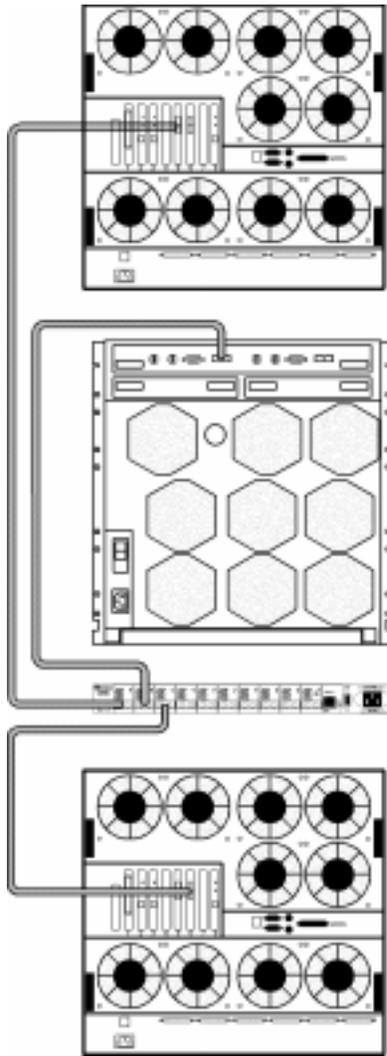
Figure 26. Example of a cluster with two HP NetServer LXr Pro8s, one HP FC-AL hub and one disk array
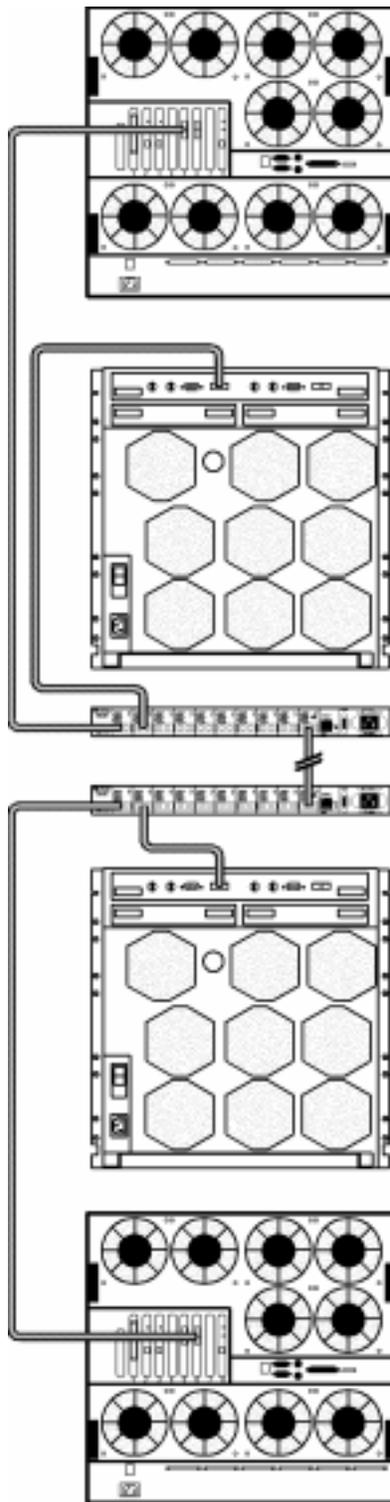
Figure 27. Example of a cluster with two HP NetServer LXr Pro8s and cascaded hubs

6. Verify FC-AL Cabling

Correct cabling example, HP FC-AL short-wave hub (HP A3724A)

In a cascaded configuration of HP FC-AL short-wave hubs, use a short-wave cable to connect any port on the first HP FC-AL hub to any port on the second HP FC-AL hub. In the following example, Port 1 on Hub A connects to FC-AL Device 1; Port 10 of Hub A connects to Port 1 of Hub B; and Port 10 on Hub B connects to FC-AL Device 2. Any short-wave FC-AL device or hub can connect to Port 10 of a short-wave hub.
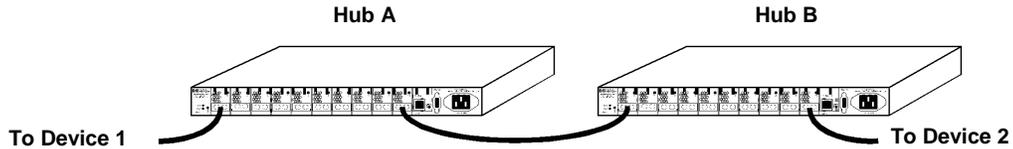
Figure 28. Cascaded HP FC-AL short-wave hub (HP A3724A) configuration

Correct cabling example, HP FC-AL long-wave hub (HP A48394A)

In a cascaded configuration of HP FC-AL long-wave hubs, use a long-wave cable to connect the long-wave port (Port 10) on the first HP FC-AL hub to the long-wave port (Port 10) on the second HP FC-AL hub. In the following example, Port 1 on Hub A connects to FC-AL Device 1; Port 10 of Hub A connects to Port 10 of Hub B and Port 1 on Hub B connects to FC-AL Device 2. This is the only correct way to cascade HP FC-AL long-wave hubs.
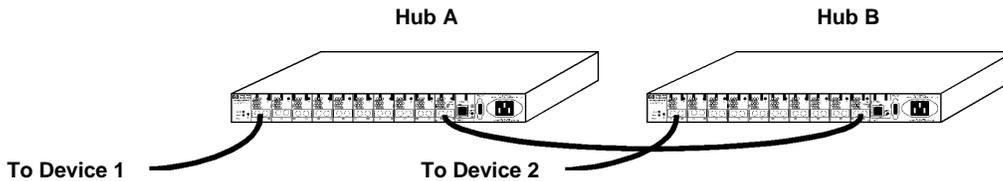

Figure 29. Cascaded HP FC-AL long-wave hub (HP A4839A) configuration

31

Incorrect cabling examples

Do NOT cable together two ports on the same HP FC-AL hub. Ports between the two connections will be eliminated from the FC-AL loop.
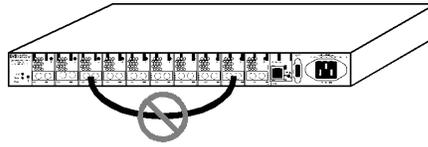

Figure 30. Incorrect cabling example: connected ports on the same HP FC-AL hub

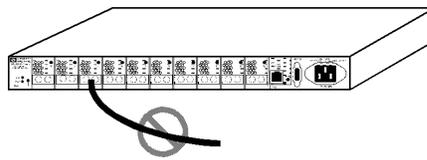Do NOT leave cables that are connected to the HP FC-AL hub disconnected at the opposite end of the cable.

Figure 31. Incorrect cabling example: disconnected cable
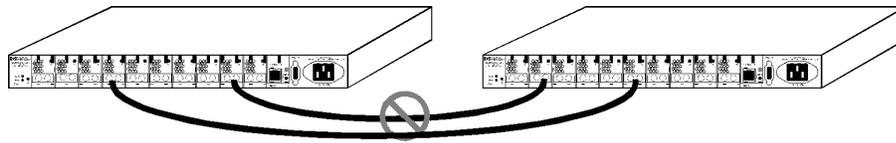
Do NOT attach more than one cable between any two HP FC-AL hubs.

Figure 32. Incorrect cabling example: more than one cable connection between HP FC-AL hubs

Attach HP FC-AL long-wave hubs only from the long-wave port (Port 10) of one long-wave hub to the long-wave port (Port 10) of another long-wave hub. Do NOT connect any long-wave FC-AL devices to long-wave hubs.
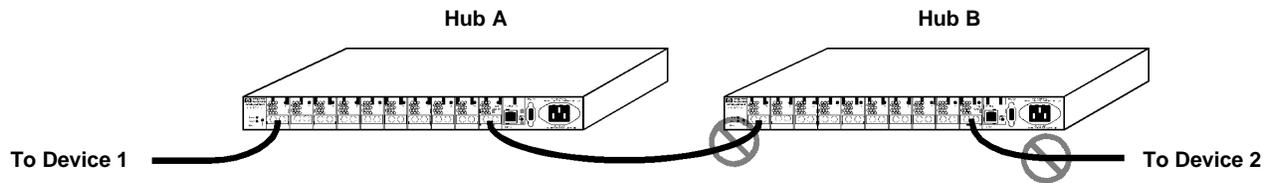

Figure 33. Incorrect cabling example: long-wave port connections to wrong device/port

In the above example, the long-wave port (Port 10) of Hub A is incorrectly connected to Port 1, a short-wave port, on Hub B. A device other than another long-wave hub is attached to the long-wave port (Port 10) of Hub B. The long-wave port of Hub A should be connected to the long-wave port of Hub B.

Nonsupported cabling example

Connecting an HP FC-AL hub to more than one other HP FC-AL hub is NOT a supported configuration.
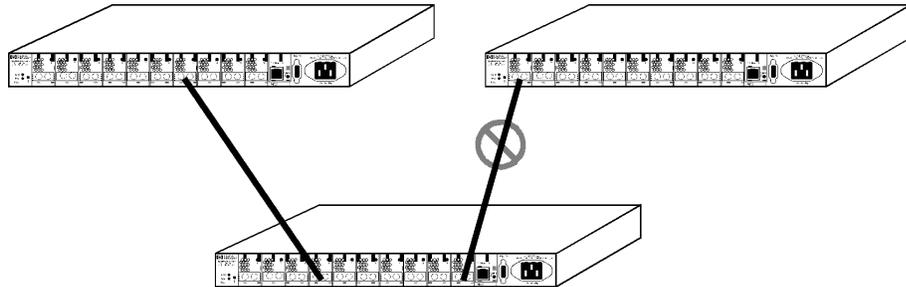

Figure 34. Non-supported cabling example: more than two HP FC-AL hubs connected

Do not attach power cords or power up the disk array or the cabinet at this time.

 To part 4 of the HP NetServer Installation Guide.

33

5 – HP NetServer Software Setup

 To part 5 of the HP NetServer Installation Guide.

6 – Shared Storage Software Setup

Install the Fibre Channel Driver on Windows NT

The Hewlett-Packard Model 30/FC Disk Array and the cabinet should be powered down at this time.

To install the Fibre Channel driver Windows NT, perform the following steps on each HP NetServer in the cluster:

a. Power up the HP NetServer if it is not already powered up.

b. Start Windows NT if it is not running and log into an account with administrative privileges.

c. Insert the Hewlett-Packard driver diskette into the floppy drive.

d. From the **Start** bar, select **Settings**.

e. From the **Settings** menu, click **Control Panel**.

f. From the **Control Panel** window, double-click **SCSI Adapters**.

g. From the **SCSI Adapters** window, click the **Drivers** tab.

h. From the **Drivers** window, click **Add**.

i. Click **Have Disk**.

j. From the floppy disk drive, click **HP HHBA-5000X Fibre Channel Host Controller**.

k. Click **OK**.

When the installation is complete, remove the diskette, shut down Windows NT, and, without powering up the disk array, reboot the HP NetServer to load the driver.

Power down the HP NetServer.

Power Up the HP Model 30/FC High Availability Disk Array

1. Connect the Disk Array's Power Cord

NOTE	The correct right-angle power cord must be used. If an incorrect power cord is used, the fan pack cannot be opened without powering down the disk array and disconnecting the power cord.

a. Make sure the disk array's power switch is in the off position, then connect the correct right-angle power cord to the disk array.

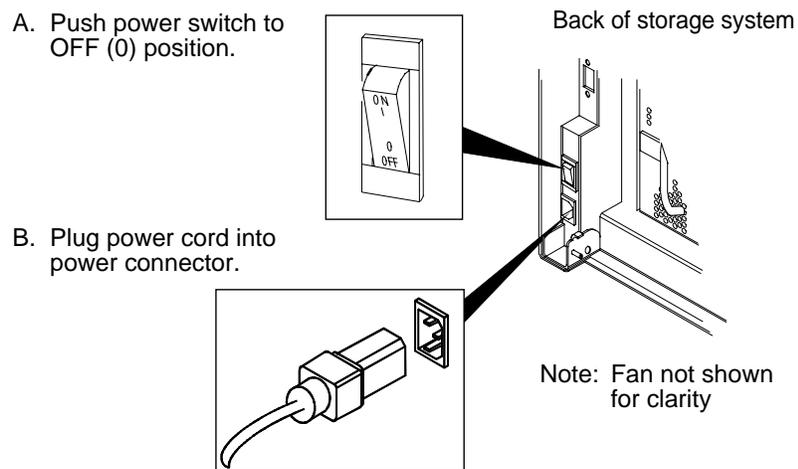b. Plug the other end of the power cord into one of the power outlets in the cabinet's PDU.

Figure 35. Connecting the power cord (typical)

2. Connect the HP FC-AL Hub's Power Cord

a. Connect the power cord to the HP FC-AL hub.

b. Plug the other end of the power cord into one of the power outlets in the PDU.

c. If the installation uses cascading HP FC-AL hubs, connect a power cord to the second HP FC-AL hub and plug it into the PDU.

3. Power Up the Cabinet

a. Connect the cabinet's power cord to the power source.

b. Turn the main power switch at the front of the cabinet ON.

4. Power Up the Disk Array

Turn on the disk array's power by setting the POWER switch on the back of the unit to ON. The green POWER-ON LED on the front of the disk array will light up and the fans will rotate.

On a disk array fully loaded with 30 disk modules, allow 8 to 10 minutes for all the disk modules to spin up.

If the BUSY LEDs on the disk drive modules do not light up, check that the disk array's power cord is properly installed and connected to the cabinet's PDU.
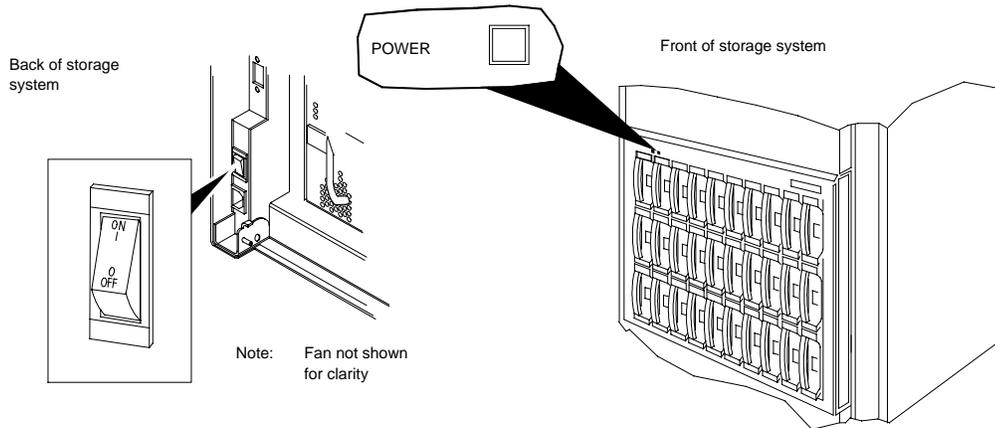

Figure 36. Powering up the disk array

5. Power Up the HP NetServers

When the disk array is fully powered up, power up the HP NetServers. After powering up the HP NetServers, verify the FC I/O adapter, GBIC, and cable installation on each HP NetServer in the cluster by looking at the two LEDs on the FC I/O adapter. If the LED on the right is on, the FC-AL is complete. If the LED on the left is on, data is being transferred.

Install the HP Model 30/FC High Availability Disk Array Software

The HP Model 30/FC High Availability Disk Array software consists of the following host-resident utility:

- ArrayGUIde™

  ArrayGUIde is a software tool for managing HP Model 30/FC High Availability Disk Arrays connected to HP NetServers. ArrayGUIde consists of a graphical user interface (GUI), called Arraymgr, and a storage system agent, called Agent.

  – Arraymgr is used to configure disk arrays and monitor their status from any host on a TCP/IP network.

  – Agent runs in the background on an HP NetServer.

Install this software utility by following the detailed instructions included in the NT Addendum, *Hewlett-Packard Model 30/FC High Availability Disk Array User's Guide and Service Manual Addendum for Microsoft Windows NT 4.0* (part number A3661-90019). The disk array should be powered up while this utility is installed.

1. To install ArrayGUIde, see the Installing ArrayGUIde section of chapter 8 of the NT Addendum.

Set the HP Model 30/FC High Availability Disk Array Operating Mode

The disk array is shipped from the factory with auto-trespass, which is one of the host mode parameters, turned on. Auto-trespass must be turned off for the disk array to operate correctly on the Microsoft Windows NT operating system.

1. Turn off Auto-Trespass

   a.   Make sure that ArrayGUIde has been installed onto the HP NetServers.

   b.   From the **Start** bar, select **Programs**.

   b.   Click **Windows NT Explorer**.

   c.   Double-click **Program Files**.

   d.   Double-click **CLARiiON**.

   e.   Double-click **Agent**.

   f.   Double-click the program file SetHM_a.exe.

   g.   Using this program to change the host mode parameters causes all disk arrays attached to the HP NetServers to reboot automatically.

◄ RETURN   **To part 6 of the HP NetServer Installation Guide.**